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AUTHOR Jones, Vernon A.
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ABSTRACT

Historical information concerning Centres of Excellence in British Universities and the concept of excellence in relation to the roles and functions of the universities, the elements of excellence, and equality are considered. The term "centre of excellence" may be applied to an institution or department that has successfully specialized in teaching a range of related subjects or has become preeminent in the study of a single subject. Centres of Excellence are traced from the ancient Greeks and Romans to the present British universities. The concepts of excellence and equality are pursued in relation to universities and elite, mass, and universal higher education. A number of views are analyzed to help determine what factors or elements should be included in the meaning of excellence. Excellence in teaching, research, and students is addressed with attention to keeping research and teaching together in universities. Excellence in the various aspects of teaching and basic and applied research is examined. The measurement of excellence in teaching, research, and programs is analyzed in relation to the present environment of scarce resources for higher education. Program evaluation, teacher education, the measurement of research output, and the measurement of department excellence are also covered. The roles of government, the University Grants Committee, and management in resource allocation are examined in relation to excellence in the functions of universities, and the dilemmas facing university administrators for the next decade are noted. A bibliography and information on the interviewing undertaken as part of the analysis of Centres of Excellence are appended. (SW)

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CENTRES OF EXCELLENCE IN BRITISH UNIVERSITIES

VERNON A. JONES

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Dissertation submitted as part requirement for the Degree of Master of Science in Management Studies of Durham University Business School.

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Supervisor: Dr. L.H. Campbell

HE 013 534

DEDICATION

This thesis is dedicated to my family - my wife FAY who in many loving ways gave me the encouragement necessary to complete this work and my daughters KIM and DONNA.

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ABSTRACT

Centres of Excellence are traced from the ancient Greeks and Romans to the present British universities. To enable the concept of excellence to be understood in relation to the roles and functions of universities, the elements of excellence and equality have been analysed. Excellence in teaching, departments, teachers, programmes, research and students is discussed. The measurement of excellence is analysed in relation to the functions of universities and the criteria used for the measurement are discussed. The roles of Government and management in resource allocation are examined in relation to excellence in the functions of universities. The dilemmas facing university administrators for the next decade are set out for others to analyse and study.

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Chapter 1

INTRODUCTION

- Background
- Objectives
- Considerations & Limitations

INTRODUCTION

Background

'Centres of Excellence' have been in existence in British Universities for many years and are recognised throughout the world for their teaching, research, discoveries and technical innovations (Appendix A and Dainton 1979).

The proliferation of courses in British Universities has made the case for greater concentration of university studies into 'centres of excellence', particularly postgraduate studies. The term may be applied to an institution or department which has successfully specialised in teaching a range of related subjects or become pre-eminent in the study of a single subject (Third Report from the Expenditure Committee - Postgraduate Education 1973).

Recently the subject of 'centres of excellence' has been given considerable publicity in the United Kingdom and the United States of America (THES 1978b, Wilby 1979) due to a number of issues, on both philosophical and economic grounds. The issues include:-

1. The prospects of declining enrolments and problems of a steady state (THES 1979);

2. The emergence of those who challenge the value of higher education (Marsee 1978);
3. Inflation and the shrinking educational dollar (McKie 1978 and THES 1979);
4. The weak market for graduates (Dixon 1979);
5. An increasing demand for universities to prove that what they claim is in fact being done in meeting their educational objectives (Becker and Maclure 1978);
6. The increasing competition for state funds (THES 1979);
7. The increase of tuition fees for overseas students (Wood 1979);
8. The decline in performance of students entering instititutions (Geddes 1980a);
9. The oversupply of teachers in non-science subjects (Standing Conference on School's Science and Technology 1980); and
10. The need to maintain high standards in higher education is gaining credibility. (Lawrence 1977)

The need to establish centres of excellence in the United Kingdom dates back to the nineteenth century when it became obvious that the German Scientists and Engineers were becoming superior to the British. Again in the first half of the twentieth century various people and committees recommended the setting up

of centres of excellence. In 1963 the Robbins Report continued to press for the setting up of special institutions which the Government rejected (Maclure 1965). In 1973"several witnesses ..... made the case for concentration of postgraduate studies into 'centres of excellence'," to the Expenditure Committee who were not convinced into recommending the establishment of such centres (Third Report from the Expenditure Committee 1973). In 1978 Leonard in his article, "Blueprint for an elite profession" said in one of his recommendations that a "restricted number of centres of excellence for engineering education must be designated". In 1980 the Finniston Report, although not suggesting directly that centres of excellence be set up, inferred that some universities be selected to carry out the education of students who would go on to do the proposed Master of Engineering Course (approximately 25%). The Government totally rejected the concept and instead plan to establish a chartered body, which has been described as toothless (THES 1980h).

The research councils have created centres of excellence from time to time and even though they are not called as such, centres of excellence in research are considered to exist at the present time (Appendix A).

The concepts of elite and mass higher education and excellence and equality in higher education are constantly discussed and written about, as evidenced by two conferences on opposite sides of

the world, Lancaster U.K. 1975 and Australia 1978 (Burgess 1978). The concepts of elitism, egalitarianism and excellence need to be analysed in the understanding of centres of excellence.

Objectives

The study was conducted in such a manner as to satisfy several objectives and in particular, the study of 'Centres of Excellence in British Universities.' The objectives may be summarised as follows:-

- trace the history and establishment of 'centres of excellence';
- analyse excellence in universities with a view of defining excellence, recognising excellence, achieving excellence and measuring excellence;
- the concept of excellence in relations to the functions of a university - teaching, research and service;
- the relation of resources and excellence in universities;
- whether the establishment of centres of excellence in British Universities is beneficial to the nation and society in general; and

- the role of Government and Management in relation to centres of excellence.

Considerations and Limitations of the Study

The scope of the subject was extensive and only an analytical and superficial study could be undertaken. The work included a historical and theoretical study of centres of excellence.

The relevant statistical information for individual universities, that could be used in the study, was in many cases unobtainable and data which could not be verified was used, such as 'A' Level points score for admission to each course of study.

The study concentrated on excellence in universities and its relationship with resources, teaching, research, teachers, students, management and Government.

A major consideration that will be encountered by university administrators in the future is the management of scarce resources and their allocation and reallocation in the pursuit of excellence. As will be discussed, when universities are striving for excellence in research, teaching, programmes and services, adequate funds are required to achieve excellence. These funds can only be obtained from programmes that are being eliminated and the administration must be adept at making the right decision as to

which programmes should or should not continue.

In Chapter 2, the study starts with the beginnings of education, and in particular higher education, going back to the Greeks and Romans, and threading its way through the medieaval universities to the modern institutions. The roles, functions and aims of higher education are set out so that the reader is able to understand the concept of excellence in universities.

In Chapter 3 the concepts of excellence and equality are pursued in relation to universities and elite, mass and universal higher education. The views of a number of authors are analysed to enable the present author to suggest what factors or elements should be included in the meaning of excellence.

Chapter 4 deals with excellence in teaching, research and students and in particular the keeping of research and teaching together in universities. Excellence in the various aspects of teaching, which includes students, courses and teachers, is discussed. Excellence in both basic and applied research is looked at.

In Chapter 5 the measurement of excellence in teaching, research and programmes is analysed in relation to the present environment of scarce resources for higher education. Programme evaluation, teacher education and the measurement of research

output are analysed. The measurement of department excellence and the criteria used is also discussed.

Chapter 6 is concerned with the role of government, the University Grants Committee and the management of universities. The management of universities includes the allocation and reallocation of resources and the management of teaching and research. In particular, the criteria for the elimination of courses is discussed in the environment of long-term financial equilibrium.

Finally, Chapter 7 concludes with recommendations, shortcomings of the dissertation, the need for centres of excellence and the dilemmas facing administrators in higher education in the United Kingdom for the next decade.

Chapter 2

THE ROLES AND FUNCTIONS OF UNIVERSITIES

- Introduction
- Historical Perspectives
  - Early Developments
  - 19th and 20th Century Developments
- What is a University?
- Aims of Higher Education
- Goals of a University
- Summary

ROLES AND FUNCTIONS OF UNIVERSITIES

Before centres of excellence can be analysed, the aims of higher education need to be stated, and the roles and functions of a university need to be explored (Appendix A).

HISTORICAL PERSPECTIVES

To begin with, a brief historical perspective of higher education would be appropriate at this stage.

Human beings have had two perennial aspirations, the first is to succeed, excel, achieve and the other asserts the worth of the individual, emphasising quality (Burgess 1978).

Early Developments

Back through history it is found that from 500 BC to the middle ages, Greece and Rome were considered the centres of learning in Trivium (grammar, rhetoric and logic) and Quadrivium (arithmetic, geometry, astronomy and music). Higher education was in most parts having its origins in Athens. Such learned men as Socrates and Aristotle being responsible for the philosophical schools and the rhetoric schools respectively (Clarke 1971). Plato on the other hand was more interested in the practical importance of mathematics. The Isocrates and

Quintilian schools were regarded highly for the rhetorical character of subjects taught and pursued. Isocrates it was said accepted pupils from abroad (Clarke 1971).

Cicero claimed that the best teachers of his day were Greek when studying law, rhetoric, philosophy and in listening to leading orators. The Greeks had established intellectual centres with expert teachers in the various branches of knowledge (Clarke 1971).

The expert mathematicians, who taught in Greece, Euclid and Pythagoras are still heard of in the study of geometry today. The former founded the School of Mathematics at Alexandria, Plato The Academy, Aristotle the Lyceum, Epicurus the open air school and Zeno the Stoic School (STOA POIKILE). The Academy, Lyceum and Stoa Poikile were considered centres of excellence, attracting students from all parts of the world (Clarke 1971).

The reputation of the Greek schools and teachers went unchallenged for centuries in surgery, medical science, architecture, arts and philosophy. When Rome had a number of Greek philosophers, it was considered the most important philosophy centre of the ancient world. The only threat came from Iambliclus in Syria who was attracting pupils from all quarters of the world late in

the 4th century where he merged the neo-platomism with mysticism and magic (Clarke 1971).

Although the Greeks were excelling in medicine, arts and the sciences, the chief centre for law was Berytus (Beirut) (Clarke 1971).

The Imperial University of Constantinople (425 AD - 1453 AD) was made famous by Psellus (1045) who was attracting students from far and wide. After its decline in the 12th century, it was once again a flourishing intellectual centre in the 14th century (Clarke 1971).

In the 12th century it was the practice of students to move from one centre to another to study under excellent teachers. At this time, logic was famous at Paris and grammar at Chatres. Universities during this period began to specialise in particular subjects, e.g. Bologna for law and Solerno and Mountpellier for medicine (Clarke 1971).

In the 13th century a network of institutions had been established in Europe. Paris and Bologna found it advantageous to band together their scholars and students and consequently acquired the term universitas for the joint institution (Minogue 1973).

The University of Paris was an association of masters and served as the model for Oxford. The term universitas was later

developed to apply to a collection of buildings in which teaching took place (Curtis 1948).

The usual mediaeval term for a university was studium generale and was open to scholars from all lands. It became the custom for a studium generale to secure recognition through a Papal Bull which granted to the masters of a university the 'ins ubique docendi', the right to teach in any institution. Oxford received official confirmation of its rights and priveleges by the Bull of Innocent IV in 1254. There is some controversy as to when Oxford started, infact Huber (1843) suggests that as early as the end of the 9th century Oxford was a seat of a school of the highest intellectual cultivation then existing. By the end of the 11th century it had as good a title to be called a university as that of Paris both for the quality of its studies and its inward organisation. Curtis (1948) however, suggests that the origin of Oxford was more likely to be 1133.

In 1209 Cambridge began due to a quarrel among the Oxford scholars some of whom migrated to Cambridge (Curtis 1948).

The evidence indicates that the Studium Generale, school of universal learning, was considered a centre of excellence, with an assemblage of strangers from all parts of the world (Newman 1856).

The collegiate system begun in Oxford and imitated by other universities, was favourable to the principle of a university. Newman (1856) said that "Colleges constitute the integrity of a University". Paris was the first to begin the custom of scholars obtaining accommodation and the masters teaching in hired rooms. This was followed at Oxford and Cambridge of students living together in a house which they hired for themselves, which was considered better (Curtis 1948).

In the 13th century, Paris was the leading university in Europe but its influence declined in the following century when Oxford began to take its place as the leader in European thought, particularly in mathematics, languages and natural science. Cambridge began to get a reputation with the relative decline of Oxford in the 15th century. Both universities concentrated on undergraduate work (Curtis 1948), which is still considered by many as the best in the world (Halsey and others - Appendix A).

The Scottish universities were the next to be established in the U.K. in the 15th and 16th century and in chronological order were St. Andrews, Glasgow, Aberdeen and Edinburgh. Others followed in the 19th and 20th centuries with the number increasing to twenty-five in Britain prior to the Robbins report and further increasing to forty three in 1980. (Robbins 1963 and University Grants Committee 1979).

The main objective of Oxford and Cambridge was training for special vocations, conspicuously the priesthood, law and medicine (Robbins 1980).

The challenge to the dominance of Oxford and Cambridge came from science and London, even though Isaac Barrow and Isaac Newton developed the new mathematical tradition, in the mid-seventeenth century at Cambridge. Boyle's two famous laboratories were in London from 1668 onwards, and others who had formed the nucleus of scientific teaching in Oxford moved back to London for lack of pupils (Reeves 1969).

The Warrington Academy was a leading intellectual centre from 1757 to 1786, with Joseph Priestly as its driving force, and Hackney College, London, took a leading place. It was about this period that the engineering disciplines began to develop in Scotland with Watt (who later invented the steam engine), Ferguson, Brindley and Stirling playing leading roles (Emmerson 1973).

19th and 20th Century Developments

Although the Berlin Polytechnic and Ecole Polytechnic were considered centres of excellence (civil engineering), Britain's excellence in engineering was not challenged until after the Great Exhibition of 1851, at which time no nation matched Britain's productive capacity, the range of her engineering achievements or

the flamboyant enterprise of her businessmen (Emmerson 1973).

Cambridge introduced engineering courses in the 1870's and 1880's and by the end of the century it was considered a centre of excellence in Britain with the German and French schools still being considered the best (Emmerson 1973).

As early as 1869 John Scott Russell suggested that 'one great technical university' be established in Britain. This was to be the start of Imperial College. Again in 1902 Balfour suggested that "only a few well equipped institutions of high rank" be established. He went on to say that "it is of national importance that these few should be placed in such a position of efficiency as to enable them to carry out successfully the highest educational work". In the years to follow, specialist institutions for science and technology were suggested to be established by the Percy Report (1945), Barlow Report (1946), the Robbins Report (1963), MacLure (1965) and the Finniston Report (1980).

Although the government gave the former Colleges of Advanced Technology university status after the Robbins Report, no specialist institutions were set up (MacLure 1965). However, it has been suggested that Imperial College was considered a centre of excellence for funding purposes by the government during the 1960's (Appendix A).

Cambridge and Oxford have preserved their predominance together with Imperial College, which is considered the best in engineering. However, Oxbridge predominance is being challenged by London School of Economics, Manchester, Birmingham, Edinburgh, Glasgow and Bristol (Halsey 1980).

WHAT IS A UNIVERSITY?

Cardinal Newman (1856) said a university is:

> "the place to which a thousand schools make contributions; in which the intellect may safely range and speculate, sure to find its equal in some antagonist activity, and its judge in the tribunal of truth. It is a place where inquiry is pushed forward, and discoveries verified and perfected, and rashness rendered innocuous, and error exposed, by the collision of mind with mind, and knowledge with knowledge..... It is a place which attracts the affections of the young by its fame, wins the judgement of the middle-aged by its beauty, and rivets the memory of the old by its associations".

AIMS OF HIGHER EDUCATION

The Robbins Report (1963) stated that the aims of higher education should be:-

(1) Instruction in skills suitable to play a part in the general division of labour.

(2) What is taught should be taught in such a way as to promote the general powers of the mind (not mere specialists but rather cultivated men and women).

(3) The advancement of learning (balance between teaching and research).

(4) The transmission of a common culture and common standards of citizenship (equality of opportunity - vocational and advancement of learning emphases being different in various institutions.

To achieve these aims he suggested that there should be recognition of individual achievement and academic accomplishment. He recognised that it was inevitable that some institutions would be more eminent than others. It is natural that talent should attract talent and that where famous intellectual exploits take place, there should develop some concentration of staff and students particularly interested in the subjects concerned. This concentration of staff and students was desirable. He said

further, that excellence should be encouraged and recognised wherever it existed and wherever it appeared. He suggested that the higher education system should produce as much high excellence as possible. However, it must be so devised that it safeguards standards.

GOALS OF A UNIVERSITY

Robbins (1980) suggests three things that might be expected of institutions in higher education:-

(1) The maintenance of intellectual standards.

(2) The two qualities essential to a liberal civilisation, open-mindedness and tolerance of criticism, and

(3) The maintenance of general culture.

Ritchie (1975) suggests that the objectives of a university should be:-

(a) The pursuit of excellence in teaching and research. A university should strive to establish and sustain high standards in undergraduate education and to give increasing emphasis to research and post-graduate education.

(b) It should continue to improve the quality of its courses designed to prepare students for entry to the learned professions.

(c) It should encourage its academic staff to participate actively in the professional, cultural, political, social and economic life of the community.

(d) It should adapt its system of organisation as required to achieve the above objectives and in particular should evolve to cope with the greater complexities inherent in a large and growing institution with increasingly diverse teaching and research programmes.

These broad objectives can be broken down into more specific aims, such as the number of graduates to be produced in the planning period, proposed research activity, the provision of suitable physical facilities and so on. To achieve these objectives a plan needs to be drawn up which will enable an institution to move to that position which will achieve these objectives if it is not already doing so (Ritchie 1975).

SUMMARY

All institutions must strive for excellence as was shown starting with the ancient schools, the medieaval universities and to the present universities in their teaching, research and their other objectives. Gardner (1961) suggests that excellence can be achieved by any individual or institution so long as they know what their objectives are and they strive for excellence in these objectives.

Chapter 3

EXCELLENCE, EQUALITY AND UNIVERSITIES

- Excellence
- Different Kinds of Excellence
- Pursuit of Excellence
- Recognition of Excellence
- Equality
- Excellence and Equality
- What is Higher Education?
- Summary

EXCELLENCE, EQUALITY AND UNIVERSITIES

The meaning of 'excellence', an oft-invoked ideal for higher education (Van de Graff 1976), is of the utmost significance in the context of this dissertation and "Centres of Excellence".

"The English verb 'excel' comes originally from the Latin excellere meanting 'to rise above' (Jorgensen 1980). The Oxford English Dictionary defines excellence as 'the state or fact of excelling; the possession chiefly of good qualities in an unusual degree; surpassing merit, virtue, worth etc.; dignity, emminence". A variety of similar current meanings - to surpass, to be better than is cited by Jorgensen (1980). He says they imply two things: (1) "a higher degree of goodness", and (2) "the surpassing of general norms or standards". The definition of excellence presumes both an evaluation and a judgement.

Excellence is the result of superior attainment in meeting distinctive goals and is not the possession of any one area or skill, or virtue. Excellence exists in many varieties in higher education and may be recognised at different levels and different kinds may be found to exist. Excellence can not only be possessed by any single institution, but by individual and groups of both individuals and institutions that strive for the highest standards in whatever they do (Scott 1976).

An Austin College faculty panelist said "Excellence is an ideal that both beckons positively and makes for despair. It is not the common property nor the likely product of most men's efforts. In the learning process 'excellence' comes about rarely, and only when the teacher is truly expert and the students are truly adept" (Hinkle 1978).

The educationalists interviewed by the present author suggested that excellence in higher education consisted of the following elements:-

- added value;
- the contribution of improvement to teaching and research and this contribution must be relevant to the goals of a university;
- a combination and different mixes of
  (1) a crushing power of analysis in a particular subject area,
  (2) an assembling of factual material in a way that changes one's understanding of the way the world works in a particular aspect and
  (3) the quality of scholarship, recognised by the correctness of facts;

- reputation an institution earns;
- high quality research output;
- high quality of students and teachers;
- funds attracted from research councils and industry;
- size of departments measured by number of degree students;
- scientific and research publications;
- the way industry sought graduates from various institutions; and
- the citing of authors in papers and publications (Science Citation Index).

Excellence in higher education is traditionally associated with outstanding or superior staff, students, departments, academic programmes and research activity. Excellence usually involves all of these. A reputation for excellence is highly prized by institutions since it helps them to attract higher quality students and staff, to attract resources and to attract industrial research contracts, which in turn fosters continued excellence (Nelson 1977).

DIFFERENT KINDS OF EXCELLENCE

There are many kinds of excellence in the intellectual field:-

- the intellectual activity that leads to a new theory or a new machine;
- the mind that finds its most effective expression in teaching and research;
- the mind that works best in quantitative terms; and
- the mind that revels in poetic imagery (Gardner 1961).

Excellence is meaningless unless it is linked with a concept of the 'kind of which it was an exempler' (Keeton 1971). With this in mind, Keeton (1971) came up with two kinds of excellence, (1) Quality based on a distinctive philosophy and the achievement of goals, and (2) Quality based on distinctive resources such as student characteristics departments, capital and local setting.

Excellence is possessed by individuals, institutions and groups of individuals. It may also be found wherever people and institutions strive for the highest quality and standards in whatever they attempt.

PURSUIT OF EXCELLENCE

A banner to which all academic staff, institutions of higher learning and society, will rally is that of the 'pursuit of excellence'.

Academic staff speak of excellence as the raison d'etre of higher education. In the Rowntree Project at the University of Lancaster, a teacher when interviewed said, "We are aiming to do a very intensive job here, to turn out people who can go off and win International Prizes or hold responsible and premier positions in orchestras" (Percy and Salter 1976).

There is confusion when one speaks of institutional excellence. While some people speak of excellence as the superior achievement of distinctive goals, others consider excellence as a synonym for high prestige. Thus national reputation, high selectivity of teachers and students, or a large endowment are considered to be indications of excellence when in fact they are indicators of social status that may or may not be associated with the superior attainment of distinctive goals (Scott 1976).

Prestige is conferred upon institutions for reasons having little to do with institutional purposes and is usually related to size, breadth of offerings and existence of graduate programmes.

Excellence and prestige should not be confused with each other so as to allow an institution to move towards achieving prestige rather than to obtain its original and principal educational objectives of achieving the highest standards of scholarship and research (Nelson 1977, Taylor 1979).

Each institution should however, develop its own individualities and distinctive features so long as they are doing something that contributes to the total pattern of striving for excellence in performance. Excellence can be achieved in any institution even though their roles, goals and achievements are different (Gardner 1961).

In higher education there is no excellent performances without high morale. In many individuals and institutions the enemy of high morale has been a kind of hopelessness on the part of both administrators and departments about ever achieving distinction as an individual institution. Such attitudes have a corrosive influence on morale and make it virtually certain that the individual or the institution will never achieve even that kind of excellence which is within its reach. For there is a kind of excellence within the reach of every institution (Gardner 1961).

To achieve excellence, people and institutions must not only strive for it, they must be motivated as well. As Thomas Edison once said, "Invention is 1% inspiration and 99% perspiration".

He may have exaggerated the situation somewhat, because if someone does not have the talent to excel, nothing can be done by a teacher to develop excellence. Teachers will be ready to admit that a student either does or does not have the talent or the potential to be excellent (Percy and Salter 1976).

As suggested above, talent is not enough, it involves more than talent. One must have character and motivation to make the most of ones talent (Gardner 1961). Research carried out by Lewis Terman on 1,000 gifted children in the early nineteen-twenties and their progress was still being monitored in the early sixties. The results obtained by Terman (Gardner 1961) showed that the performance of the children continued at a very high standard. Excellence involves discipline and tenacity of purpose (Gardner 1961).

A country or institution that does not have the capacity to evoke high individual performance will drop to mediocrity (Ashby 1971). Sir Eric Ashby goes on to say that if there are gifted students who are striving for excellence they should be treated as elite.

RECOGNITION OF EXCELLENCE

"They are the lords and owners of their faces,
Others but stewards of their excellence"

(Sonnet - Shakespeare).

Institutions can be centres of excellence if the definition of excellence was focussed on the quality of educational results and the extent to which the institution fulfills its goals and objectives (Nelson 1977).

Centres of Excellence have been acknowledged among the 'Ivy League' institutions in the United States of America, Oxford, Cambridge and London Universities in the United Kingdom, the Grandes Ecoles in France and the Technischen Hochschulen in Germany. Within these institutions a number of centres of excellence exist (Taylor 1979, Wilby 1979, Trilling 1979 and Lawrence 1979).

Halsey (1980) asked one in six university teachers, which was the best department in their disciple and obtained the results shown in Table 3.1. The Table indicates fourteen different subjects in which teachers polled their preferences and the first five placings for each are listed. It was suggested however, that the results were already out of date as many eminent academics had moved to other universities.(Wilby 1979).

Matheson (1972) using the Science Citation Index for 1969 and the 1969/70 edition of Scientific Research in British Universities and Colleges identified "Centres of Chemical Excellence" in the United Kingdom. This work will be considered fully in Chapter 5. The results should however be treated with

TABLE 3.1 BEST UNIVERSITY DEPARTMENTS IN SELECTED SUBJECTS

	TOTAL	CIVIL ENGINEERING	ELECTRICAL ENGINEERING	ENGLISH	FRENCH	HISTORY	PHILOSOPHY	ECONOMICS	GEOGRAPHY	LAW	SOCIOLOGY	BIOLOGY	MATHS	PHYSICS	CHEMISTRY
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Birmingham			3.6 (4)											2.5 (5)	
Bradford					7.6 (5)										
Bristol					9.1 (4)				5.9 (3)			4.7 (5)		4.1 (40	7.4 (4)
Cambridge	9.2 (2)	36.2 (2)		24.6 (2)	13.6 (2)	21.0 (2)		20.3 (2)	56.3 (1)	30.9 (2)	6.5 (4)	29.1 (1)	36.9 (1)	43.9 (1)	26.1 (1)
Durham									4.4 (4)						
East Anglia				4.2 (4)											
Essex											9.8 (3)				
Leeds		3.8 (4)	4.2 (3)												3.1 (5)
Liverpool												4.7 (5)			
London - Kings	*27.8 (1)														
Imperial College		40 (1)	33.1 (1)										9.4 (3)	13.7 (3)	17.0 (3)
University College		3.8 (4)		6.3 (3)			2.7 (2)		14.8 (2)					2 5 (5)	
Queen Mary College			3.6 (4)			3.7 (3)		49.8 (1)	3.0 (5)	8.2 (3)	27.1 (1)				
London School of Economics										3.1 (5)					
Manchester	3.6 (5)		3.6 (4)		10.6 (3)						6.5 (4)		13.3 (2)		
University of Manchester Inst. of Science and Technology			9.6 (2)												
Oxford	9 (2)			35.9 (1)	22.7 (1)	47.2 (1)	89.3 (1)	7.0 (3)		35.1 (1)	11.2 (2)		9.4 (3)	14.7 (2)	20.1 (2)
Sussex												5.6 (3)			
Warwick								2.2 (5)							
York				4.2 (5)											
Swansea U.C.		5.7 (3)													
Aberdeen									3.0 (5)						
Edinburgh	5.6 (4)					3.7 (3)		3.0 (4)		4.1 (4)		10.3 (2)	4.0 (5)		
Glasgow	3.6 (5)											5.6 (3)			

Source: "The dons guide to the best varsitres" - Peter Wilby.
The Sunday Times 16/12/79 Page 13. These are results of a survey conducted by Professor A.H. Halsey, Director of Department of Social and Administrative Studies - University of Oxford in response to a question "Which is the best department in your subject?"

Notes: * UCL - 4.8%
Numbers in brackets give the position each department finished in the survey.

caution because the period of time was restricted, the time gap between publication and citation was small, citation counting was controversial and, active and crowded research fields had more citations than the more esoteric disciplines.

Irvine and Martin (1980b) came to the conclusion using 'converging partial indicators' (to be discussed in Chapter 5) that the radio astronomy centre at Cambridge (U.K.) performed extremely well as a research centre.

In 1911 Theodore Roosevelt said that Troop (California Institute of Technology) was an institution where he would like 99% of American students to be educated, because it was a place that could do industrial work better than anyone else could (Emmerson 1973).

It has been suggested that the United Kingdom has a number of centres of excellence. Universities of Oxford, Cambridge, London, Southampton, Birmingham, Edinburgh, Manchester and Manchester Institute of Science and Technology, and the Open University (Appendix A, Martin and Irvine 1980, McKie 1980c, Meynell 1978, Hermann 1980, The Open University 1979).

EQUALITY

The perennial question about excellence invariably raises the

other universal ideal in higher education, 'equality'. The concept of equality needs to be analysed in relation to excellence (Burgess 1978).

Equality is a condition of being equal in quantity, amount, value, intensity (The Oxford English Dictionary). It implies that all men are equal, all men are equally important, all men should be treated equally and equality should be granted to every man regardless of colour, religion or other attributes. However, it is also recognised that equality of opportunity is affected by circumstances of people and that perfect equality of circumstances cannot be guaranteed (Scott 1976). The talents and motivations of people differ, consequently, achievements will differ (Gardner 1961). Every person is not capable of entering higher education.

The concept of equality in higher education means equal benefits, rights or treatment according to a laid down principle. It is not meant to be the same for everybody nor does it mean that everybody should go on to higher education. Everyone has a right to equality of opportunity to as much higher education as he wishes so long as he is able to do so (Husen 1976).

EXCELLENCE AND EQUALITY

Sir Peter Venables (1972) said:-

> "Equality of opportunity .... must provide the maximum degree of education mobility through a diversity of institutions and upwards through a .... variety of routes to a diversity of excellence, for the well-being alike of the individual and the community".

The dilemma that exists between excellence and equality is whether they are mutually exclusive?

Gardner (1961) suggests that it is possible to have excellence and equality in higher education and at the same time seek to educate everyone to the limit of his ability. Burgess (1978) asserts that there is no dilemma in the controversy between excellence and equality, because he says, you cannot have one without the other.

The difficulty one has with excellence and equality is that neither have absolute meanings. In a study of seven industrialised countries it was found that evolving national patterns of power and control in higher education are key determinants of the

concepts of academic excellence and equality.

Before one gets too deeply engrossed in the discussion of excellence and equality in higher education, one must know what higher education is.

WHAT IS HIGHER EDUCATION?

Martin Trow (1974) refers to three phases of higher education:-

1. Elite - where, upto 15% of the age group enters higher education;
2. Mass - where upto 50% of the age group enters higher education; and
3. Universal - where 100% are entitled to enter higher education.

In short, he says, "The analysis of the phases of higher education in advanced industrial societies, of the development of parts of the system during these phases, is designed to illiminate problems and patterns common to different societies and systems".

He refers to the elite higher education phase as the "mode of education and the level of intensity and complexity at which the subject is pursued". Mass education by contrast "is centred

on the transmission of skills and knowledge through relations between teachers and students which are briefer and more impersonal". Elite higher education makes large demands on students and ambition is the central distinguishing characteristic of this phase. Elite higher education links up with the elites of society and through this process, elite institutions, like the Grandes Ecoles in France and the Technischen Hochschulen in Germany, tend to become centres of academic distinction (Trilling 1979, Lawrence 1979).

Elite higher education and intellectual distinction are not identical, although a relationship exists. Academic excellence is not only found in institutions of elite higher education but in other higher education institutions as well (Trow 1976).

The opponents of elite higher education are those who hold egalitarian values and policies, those who associate elite higher education with the upper social classes and those who feel it leads to positions in the elite social hierachies. (Trow 1976).

Halsey (1975), an academic with egalitarian principles, in a reply to Johnson's articles on "The University and its Enemies", in the Times Higher Education Supplement (1975) put forward his views on elitism and egalitarianism -

> "Institutions of scholarly elitism can only be reconciled to an egalitarian age if teachers and students enter exclusively on the test of academic merit and receive no extraordinary privelege. Selection to the elite of the poor scholars would, moreover, be substantially as well as formally open to all the classes, all the races and both sexes. Only in this egalitarian context could we accept elitism".

Elite and mass higher education distinctions should be relinquished because the assumptions made by society are not conducive to the pursuit of excellence (Gardner 1961). Similarly, 'elite' and 'elitism' are words that should be used sparingly by universities as they have the connotation of going hand in glove with the upper social class in Britain. They should be replaced with excellent and excellence in the context of superior attainment in meeting distinctive goals in higher education.

Students in the Rowntree Project reacted against the word 'excellence' because they felt it to be 'elitist', which implied a competitive ethos and an absolute attitude towards what should be banned in higher education (Percy and Salter 1976).

The way to promote excellence says Mary Berry (1978), is to raise the visibility of the excellence crusade and to focus attention on the causes of failure and the specific remedies that can correct failure.

To promote excellence does not mean that institutions of higher education should be called upon to solve the social and economic ills of a country. Schooling cannot make-up entirely for the influences of society or family background or for differences in interests, abilities and motivation. This is partly the role of society and role of governments. Policies influence inequalities in higher education and cannot be corrected by institutions (Scott 1976, Lawrence 1977).

SUMMARY

Excellence and equality have been discussed in relation to their definitions and higher education. It was found that excellence consisted of a number of elements in higher education which will be considered in more detail.

The striving and recognition of excellence was also discussed and generally, excellence is considered as the raison d'etre of higher education.

Chapter 4

TEACHING RESEARCH AND THE STUDENT

- Introduction
- Teaching
  - Teachers
  - Courses
  - Students
- Research
- Summary

TEACHING, RESEARCH AND THE STUDENT

Introduction

Specialisation is necessary for institutions of higher education, both for vocational reasons and for the advancement of knowledge. The necessity of specialisation in universities is firstly to acquire the skills necessary for carrying on the business of an advanced community; secondly, it is necessary to maintain the highest standards of excellence in various branches of scholarship; and finally, it is necessary to promote intellectual and practical discovery in the graduate schools and the research institutes (Robbins 1980).

The main outstanding contributions to culture and civilisation in the arts, humanities and the sciences have come from men who are specialists. Although specialisation is completely appropriate at the graduate level, early specialisation in schools is a disgrace (Robbins 1980).

The advancement of learning is one of the primary duties of the universities. To achieve excellence in specialist training and facilities for research, considerable development is desirable in the enforcement of high standards such as that prevailing at the great graduate schools of the United States (Robbins 1980).

Teaching and Research

The three characteristic functions of a university teaching, research and service have over the years widened immensely in size and scope as knowledge and subjects of study have multiplied and student numbers have proliferated. But if universities are to retain an influence which is distinctive they must continue to make their contribution in each of these three areas, not allowing any one to dominate the other two (Niblett 1975). The Robbins Committee supported the non-separation of teaching and research but felt, that teaching could be improved and it need not be made at the expense of research (Robbins 1963). They said there was no borderline between teaching and research; they are complementary and overlapping activities. Sir Rex Richards on two occasions stated the immense value of the 'interplay' between teaching and research:-

> "In the United Kingdom universities, it has been accepted that the teachers should also engage in advanced study and research, a convention which has contributed a good deal to the vitality of the universities". (Committee of Vice Chancellors 1980) and

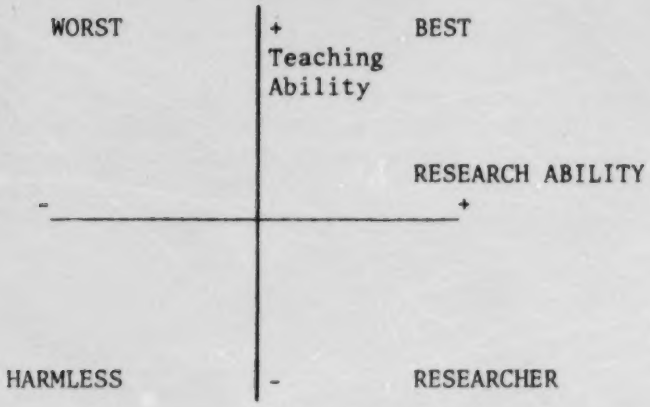
> "The interplay between teaching and research makes a university a university rather than just a school for older pupils. A teacher's success in research or scholarship gives him an enthusiasm and authority which can stimulate and excite his pupils. At the postgraduate level the combination of able young minds and experienced researchers working in collaboration have proved to be outstandingly successful and the high esteem in which Britain's universities are held internationally owes much to this system (Richards 1980)."

Sir Frederick Dainton (1979) cited Rabindranath Tagore, the Indian poet, as being the most powerful advocate of research and teaching being in the one place. Tagore wrote:

> "The teacher who has come to the end of his subject, who has no living traffic with his knowledge, but merely repeats his lessons to his students, can only load their minds; he cannot quicken them".

Dainton (1979) illustrates the value of staff to a university with various combinations of teaching and research in figure 4.1

FIGURE 4.1



The most desirable combination is in the top right-hand quadrant where both teaching and research is of a high quality. The top left-hand quadrant is where teaching ability is high and research ability is low. Although those in the top left-hand quadrant can be relied upon to teach successfuly, at best they would teach something that is sterile and at worst, teach something which is erroneous or out of date.

The interplay between teaching and research is much more complex than that shown in figure 4.1.

All the educationalists that were interviewed by the present author, were unanimous that teaching and research should not be

separated. They also stated that all excellent teachers were not necessarily excellent researchers and vice-versa. There were however, a number of excellent teachers who were also excellent researchers (Appendix A). The latter category were considered by Dainton (1979) as lying in the right-hand top quadrant in figure 4.1.

There have been many other authors who support the concept of not separating teaching and research as each enhances excellence in the other (Sir Alex Merrison in McKie 1980, Leave and Jenkinson (1978), Muller (1980b) and The Times Higher Education Supplement (1980g) amongst others).

Professor Dahrendorf, however, proposed that research should not only be separated from teaching, it should be divorced from the universities (Neave 1978). Distinguished supporters may readily be found for this argument that research effort is most efficiently organised in research institutes, as is the practice in European countries and the United States (Bawden 1980). Much of the research work in East Germany (Muller 1980a) is carried on in the Institutes of the Academy of Sciences which are outside the higher education system. Western Germany, France (Bawden 1980) and the United States (Kolata 1979) have research centres separated from institutions of higher education.

Mrs. Shirley Williams, the then Secretary of State, in her

evidence (Feburary 1978) to the Select Committee on Science and Technology stated that research in Britain was of a high quality and that West Germany, France and other countries wanted to copy the way in which scientific research was based in British universities rather than separated in research institutes (Bawden 1980).

The support for research to be based in universities outweighs the separation of research from universities. From the interviews conducted it was abundantly clear that the main reason for the marriage of research and teaching in Universities to continue was one complements the other in the achievement of excellence (Appendix A). The words teaching and research have common activities such as "thinking, talking, fact-finding, writing, reading, criticising, hypothesising, testing, discussing, disseminating and thinking again, in so inseparable and overlapping a way", that to separate the two would be a self-defeating exercise. It would be practically impossible to set up new institutes of research in the United Kingdom without the massive transfer of resources from teaching to research, a mammoth task in itself without looking at the academic implications of the divorce (Neave and Jenkinson 1978).

In 1965 the Indian Institute of Advanced Study, a residential centre for high-level research in the humabities and social sciences, was set up. In 1978 a review committee recommended that the Institute should not continue in its present form, as it was found

that the research work done at the Institute was in no way better than that accomplished at Indian Universities (Abraham 1978).

The Science Research Council have their own laboratories at Rutherford, Daresbury and Appleton and two observatories. The Appleton and Rutherford Laboratories are in the process of merging and the decision to merge principally influenced by the advantages that were seen to be obtainable for the programs in space and communication. There was no evidence to suggest that the research work at the laboratories was superior than at any of the universities even though the annual expenditure to maintain the laboratories was in excess of £43 million (28% of the total expenditure) in 1978/79 (Science Research Council 1979).

In order to demonstrate the areas of excellence in each of the areas of teaching and research each needs to be considered separately.

TEACHING

Excellence in teaching means effectiveness in teaching. Most of the analytical work on teacher effectiveness has been done at the elementary and secondary levels (Alstyne 1977). Excellence in teaching is demonstrated by the quality of the teachers, courses, students, administration and academic services, such as library (Downey 1977).

Excellent teaching is difficult to evaluate and judgements are made primarily on research criteria such as publications (Aleamoni 1974). Lord Robbins (1980) when discussing the low quality of some university staff, referred to the 'output of learned journals' as his criteria to judge this quality. In Chapter 5, the measurement of excellence in teaching will be examined.

Teacher

"The teacher in higher education is one who works at the frontiers of knowledge and is thus in a position to grasp, grab or exchange information on the most up-to-date findings in his field or discipline" (Neave and Jenkinson 1978).

Excellence in teaching can be enhanced by the following: firstly, teachers in universities must have a complete mastery of their subject or discipline (Downey 1977). Subject matter specialisation is important in a teacher to be effective. Secondly, if universities are serious about encouraging excellence in teaching they must be prepared to reward such excellence in a manner similar to excellence in research (Aleamoni 1974). Although Britain has been less inclined to follow the pattern of rewarding on the basis of research and publications, there is evidence that the situation was changing (Halsey and Trow 1971). Thirdly, regular evaluation of excellence in teaching should be conducted by specialists who know about the subject and can make legitimate

value judgements about the work in question (Rhodes 1976). Lord Robbins (1980) said that the students are not qualified to evaluate teaching as they lack the expertise necessary to make informed judgements. This aspect will be discussed further in Chapter 5 when the valuation of teaching by students and the contribution it makes to the measurement of excellence will be pursued.

Peer evaluation should be based on the procedural adequacy of the course, appropriateness of course content and objectives, the adequacy and quality of examinations, the teacher's self-report and other course material or comments the teacher wishes to submit (Aleamoni 1974), not only to provide a department with evidence for judging a teacher's qualifications for appointments or promotion, but also to appraise teaching in order to improve it. It would in addition be a means for a teacher evaluating his own performance so that he could become more effective (Report to the Executive Committee of the Faculty on Policies and Procedures on Tenure Appointments 1965).

And finally, the requirement to prosecute research by every university teacher should be crossed out of every employment contract. Excellent teachers can get on with the task of teaching and using their energies more productively. In turn, the general level of research quality would rise (Dainton 1979).

Courses

There has been very little effort to explore the content of courses in the United Kingdom (Dainton 1979). It has been suggested that the Carnegie Commission in the United States did not address itself to one of the most important questions about higher education, "What should its content be?" (Kaplan 1977). The same criticism may be levelled at the Robbins Report (1963).

Although many authors have made this criticism, very little appears to be done about course content in universities (Dainton 1979, Kaplan 1977, Finniston 1980, amongst others). Recently the Institution of Electrical Engineers began assessing electrical engineering courses for accreditation purposes as a result of the Merriman Report (1978) recommendations (Senside 1980); but the accreditation is based on minimum standards required for a graduate to be able to register as a chartered electrical engineer.

All institutions of higher education should have thoughtfully developed standards of academic excellence for use in the continuous study of the quality of educational programmes. The requirement involves formal program accreditation, assessments of departmental effectiveness both through peer evaluation and student reactions, and in the quality of the decision-making process used by course committees (Rock 1976).

The substantive elements of the standards themselves are mainly determined by the departments and should ensure that the standards and formulation process used are sound and the applications of the standards are thorough, fair and consistent (Rock 1976).

The substantive elements in programmes should include:-

- relevance in course content in relation to the needs of society (THES 1980f);
- new knowledge in subject areas (THES 1978a);
- excellence in the planning of a curriculum (THES 1978a); and
- a purpose for the introduction or continuation of a course (Ashby 1971).

If the value assumptions about content of courses are inadequate, then the content should be changed to include those values that society wish to nourish and preserve. The place where changes in courses should start is in the universities themselves (Kaplan 1977).

Students

There were over 280,000 full-time students attending universities in Great Britain on 31st December, 1977. Of these just over 35,000 were postgraduates. Many of these men and

women are of high ability and very much in demand on a very wide scale (University Grants Committee 1979). Not all university students are destined to be high experts and the proportion is becoming less and less (Robbins 1980).

There are three elements which contibute to a student's effectiveness:-

(1) His or her ability to learn.

(2) His or her opportunity to learn.

(3) His or her incentive to learn (Piper 1978).

Britain produced a university graduate of a quality which was more than respectable and the success rate of university entrants was high at 90%. British Universities produced in abundance persons with skills and creative powers of a high order (Dainton 1979).

Universities in the United Kingdom have always been extravagantly wasteful of talented students (Appendix A). Society must value talent and trained intelligence or it will be doomed (Gardner 1961). Even though the need for experts creates an elite, universities must recognise the excellence in students, select them, educate and train them, and make them experts in their field so that they confer the most benefit to their fellow-man.

Excellent, gifted and talented students have the following traits:-

- motivation for learning and achieving is high;
- able to work independently;
- curious about phenomena;
- very interested in getting answers to questions connected with their work;
- ask many questions;
- stimulated by problem solving approaches to learning;
- good at identifying significant problems in a mass of information;
- readily able to induce, to deduce, and to connect related ideas;
- see different approaches;
- come up with off-beat ideas;
- high creativity and achievement;
- relate well to teachers; and
- have long-term goals (Kuhn 1979).

Several types of criteria are used to identify talented and gifted students such as - itelligence tests, achievement tests, creativity and attitudinal measures, interviews, teacher

recommendations (not always correct), psychomoter skill evaluation and cumulative school records (Kuhn 1979).

The identification of talent has usually been on the basis of tests at 'A' Level and at different stages of a university course in the United Kingdom. These tests are far from perfect to identify talented students and Lord Robbins (1980) suggests they are 'bogus' as regards general intelligence is concerned. He suggests that teachers should be able to assess the future potentialities of young people on continual assessments during the year. Most studies have found that secondary school examination results provide the best single prediction of university performance as shown in Table 4.1 (Entwistle and Wilson 1977).

It should be added that in their analysis of entry to university and social origins, Halsey et. al (1980) found that the gaining of a place at university was also related to the social background of students' fathers.

Sir Frederick Dainton (1979) suggests that universities should progressively release entry from 'A' Level performance and an increased number of students be accepted on the basis of 'some other more personal assessment of aptitude and ability .... promise'.

TABLE 4.1

PERCENTAGE OF STUDENTS AT EACH LEVEL OF ENTRY QUALIFICATIONS OBTAINING DIFFERENT CLASSES OF DEGREE

(ADAPTED FROM UCCA STATISTICAL SUPPLEMENTS, 1965/66, 1967/68)

	DEGREE AWARDED							
'A' Level Grades	First Class	Upper or Undiff. Second	Lower Second	Third	Pass or Ordinary	Failed+	Withdrew	(N)
Three C's or Better*	9.33	32.11	27.45	9.52	12.66	5.89	3.03	(6,200)
Two C's or Better	4.17	24.06	33.20	10.14	15.31	15.31	3.78	(503)
Worse than Three C's	3.38	19.57	26.95	11.52	22.75	22.75	3.89	(3,525)
Worse than Two C's	1.74	12.57	23.79	11.99	24.95	24.95	6.19	(517)
No Information	4.75	21.36	20.00	12.20	21.01	21.01	8.47	(295)
Overall	6.72	26.54	27.18	16.80	16.80	8.75	3.63	11,040**

* 'A' Level grades divided into students with three subjects or two subjects above or below an average of a 'C' grade.

\+ Including those who withdrew through academic failure

** Students with an unclassified honours degree, or whose results are unknown, have been omitted from this analysis.

Source: Entwistle and Wilson (1977)

There should always be links between graduate and undergraduate students. Graduate education produces ideas that enliven, enrich and transorm undergraduate education. Graduate and undergraduate programmes should continue to co-exist as it invigorates undergraduate education (Report of the Association of Graduate Schools (1976).

RESEARCH

"Research covers the wide range of intellectual activities that serve to increase man's power to understand, evaluate and modify his world and his experience " (Robbins 1963).

When one speaks of research in universities it implies basic or fundamental research and applied research. Applied research is easily appreciated but the justification for fundamental research is not well known. There are three reasons for the justification of fundamental research:-

(1) the contribution it makes to society in terms of cultural and intellectual activities;

(2) the creative ideas it generates which may be useful; and

(3) 'the part it plays in the stimulation and education of undergraduate and postgraduate students'.

FIGURE 4.2.

AN INPUT-OUTPUT MODEL OF A BASIC RESEARCH GROUP

INPUTS	SCIENTIFIC PRODUCTION	OUTPUTS
(1) Stock of scientific knowledge and existing techniques	(1) Conceptual, experimental, and technical work of scientists	(1) Scientific contributions to the discipline - new scientific knowledge and techniques
(2) Institutional scientific resources e.g. skilled personnel, scientific instruments, etc.	(2) Dissemination of research results	(2) Scientific contributions to other areas of science
(3) Financial resources	(3) Support work by technicians engineers, etc.	(3) Manpower-training contributions - trained scientists, skilled workers for industry
(4) Recruited personnel, especially untrained students	(4) Administrative support work including organising adequate 'inputs'	(4) Technological contributions - technological spinoff, commercial benefits to equipment suppliers etc.
(5) 'Nature'	(5) Educational work, especially training young scientists (development and reproduction of scientific skills)	(5) Cultural contributions

Source: Irvine and Martin 1980 a

Universities should extend their research to the application of new knowledge it discovers. More University-Industry interaction in research projects is necessary (Times Higher Education Supplement 1978a) and is encouraged through their Co-operative Research Grants Scheme.

To recognise excellence in research one has to analyse scientific activity, scientific production and scientific process. Scientific activity is concerned with the consumption of inputs, scientific production is concerned with the extent to which the consumption of resources creates a body of scientific results and scientific progress refers to the extent to which scientific activity is converted by scientific production into substantive contributions to scientific knowledge (Martin and Irvine 1980). It is best illustrated by the input - output model in figure 4.2.

The dual support for research in universities comes from the University Grants Committee and the five research councils - Science Research Council, Social Science Research Council, Medical Research Council, Agricultural Research Council and National Environment Research Council (Merrison 1980). In referring to research in universities, the present author will only be concerned with the Science Research Council and the Social Science Research Council in the context of this dissertation.

The research councils have laid down guidelines on how applications for research grants are assessed. Both research councils endeavour 'to identify and develop soundly-based research projects' (Social Science Research Council 1979 and Science Research Council 1979). Peer evaluation is used in the process of assessing research projects. The national interest is considered part of the assessment, which is difficult to define as over time government and industry are reluctant to say what national policy should be followed in research (Appendix A).

The council strive for excellence in these research projects but do not always get it even though something like two-thirds of applications for research grants are rejected (S.S.R.C. 1979 and S.R.C. 1979).

The method of peer evaluation consists of a dosier being built up by the research council, containing the application, confidential opinions on the quality of the researchers, referees in the subject area and a selection of a rapporteur who is responsible for the application. The dosier goes to a committee of peers who allocate marks for each application. The Social Science Research Council use the university examination marking system i.e. first class honours, 2/1 honours, 2/2 honours and the Scientific Research Council use Alpa, Beta, Gama - Alpa (the top grading) is further divided into 1, 2 and 3. Borderline applications are scrutinised for higher quality projects that may

have been overlooked and re-evaluated. The detailed method used to identify and develop soundly based research projects was to aim for excellence to improve the qual.ty of research, but the councils settle for adequacy in some projects, which they insist on (Appendix A).

Sir Frederick Dainton (1979) has said that the effectiveness of research in British universities is of a high order in comparison with other countries, whether it be recognised through Nobel Prize winners, citation indices or major technological innovations. The defect he sees is the failure of British Society to 'harness these effectively'.

SUMMARY

In this chapter, excellence in teaching, teachers courses, students and research was discussed. The separation of teaching and research was explored and the conclusion reached was that teaching and research in universities complement each other in the pursuit of excellence and the marriage between the two should continue in universities. To have excellence in teaching, the need for the existence of talented and gifted students is desirable together with excellent teachers and courses that are relevant to the needs of society. Finally, research in universities was discussed in relation to the Scientific Research Council and the Social Science Research Council. The

excellence in research was recognised through the analysis of scientific activity, scientific production and scientific process.

Chapter 5

THE MEASUREMENT OF EXCELLENCE

- Recognition of Excellence in Universities
- The Need For Measure of Excellence
- Methods for Evaluating Excellence
  - Peer Evaluation
  - Publications
  - Citation Analysis
  - Other Possible Factors in the Evaluation of Research
  - Converging Partial Indicators
  - Radio Astronomy
  - Centres of Chemical Excellence
  - Science Research Council
- Measurement of Programme and Departmental Excellence
  - Comments on some Programme Characteristics
  - Measurement of Departmental Excellence
- Results
- Summary

RECOGNITION OF EXCELLENCE IN UNIVERSITIES

The first question one should ask is, can excellence be recognised? There is consensus that excellence can be recognised (Alstyne 1977). The Califonia Institute of Technology, with its 800 undergraduates and 850 graduate students, with 44 faculty members elected to the National Academy of Science and among its faculty and graduates having 18 Nobel Prizewinners, is considered a major centre of excellence (Cookson 1980). The microelectonics departments at the Universities of Bristol and Edinburgh are considered centres of excellence (The Times Higher Education Supplement 1979 and McKie 1980). The Grandes Ecoles and Fontainebleau in France, the Technischen Hoschulen in Germany, Delft and Leiden in the Netherlands, the "Ivy League" in the United States and the Universities of London, Oxford and Cambridge are all recognised as centres of excellence (Trilling 1979, Norman 1980, Lawrence 1979, Richardson 1978, Moorman 1978, The Times Higher Education Supplement 1978 and Wilby 1979). These institutions are considered excellent because they have excellent students, teachers, graduates, research, attractiveness and class. Excellence in people can be recognised by them being selected as Nobel Laureates, by the quality of their books and publications, by their technological innovations, by their discoveries and inventions and by the way their colleagues refer to their research and publications (Dainton 1979). Excellence in students is recognised by their results from examinations,

their school records and by interviews (Kuhn 1979).

The evidence cited above shows that there is consensus who has achieved excellence. If this is the case, Carol Van Alstyne (1977) suggests it can be measured. She goes on to say that instititutions identify feeder schools for excellent students and institutions are identified by the excellence of academic staff who are at the core of the evaluation criteria developed over a number of years.

If it is assumed that excellence is not measurable and even that it ought not to be measured, educators create for themselves a dilemma. For if excellence cannot be measured because it cannot be recognised, then no persuasive case can be made for spending money to achieve excellence. But if excellence can be recognised it can also be defined and measured (Alstyne 1977).

Sir Rex Richards states that research achievements cannot be quantified even though a group of vice-chancellors selected 25 research projects out of a total of 2,000 submitted by universities for inclusion in the booklet "Research in Universities" (The Committee of Vice-Chancellors and Principals of the Universities of the United Kingdom, 1980).

The research councils annually evaluate research projects and make judgements and measurements in terms of quantifiable

marks to enable them to make selections of which projects they should support. From the interviews conducted, it became apparent that most agreed that excellence is not easily measurable and is more difficult to measure across disciplines. There have been a number of studies to show that excellence can be measured so long as it is given some sort of meaning. These will be discussed later (Hartnett and others 1978, Meynell 1978, Matheson 1972, Irvine and Martin 1980 among others).

THE NEED FOR MEASURES OF EXCELLENCE

Drucker (1974) declares that universities must stop being parasites on the well-being of the market economy. He claims the major difference between higher education and business is that higher education must be based on effectiveness and not efficiency. Effectiveness he says can be measured easily and precisely using behavioural objectives.

He adds that teachers are knowledge workers and should be managed like other workers. What really matters is for universities to be accountable and need:-

- clear objectives and goals;
- priorities of concentration;
- measurements of performance;
- feedback on their efforts, that is, build self control from results;

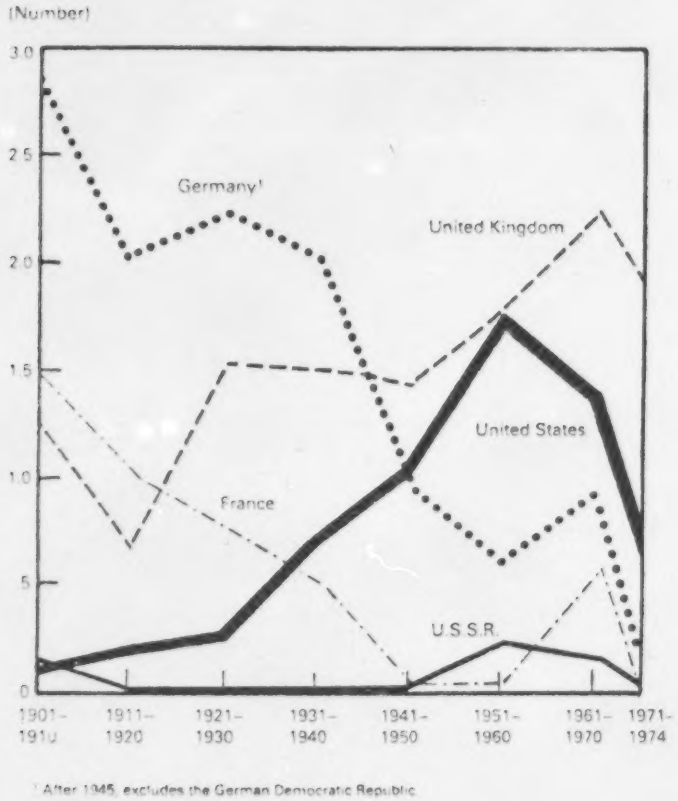
- organised audit of objectives and results;
- identification of unsatisfactory performance and activities that are absolute, unproductive or both;
- abandonment of low performance activities; and
- competition between universities to hold them to performance standards.

The implication of such a scheme would not uphold all the rights of a university which are to select their own students, appoint their own staff, control their syllabuses and degree standards, determine their own size and rate of growth, fix the balance between teaching and research and exercise complete freedom in spending the cash the University Grants Committee hand over (Johnson 1975).

A shortcoming of staff in institutions is to consistently tell society that they strive for excellence but are unable to demonstrate in quantifiable terms the excellence achieved by students, staff and institutions. Sir Frederick Dainton (1979) recently showed that the excellence of British academics can be evaluated in four different ways which are worth reproducing here.

Figure 5.1 (Reproduced from Dainton, 1979)

Nobel Prizes in Science per 10 million population for selected countries 1960-1974.

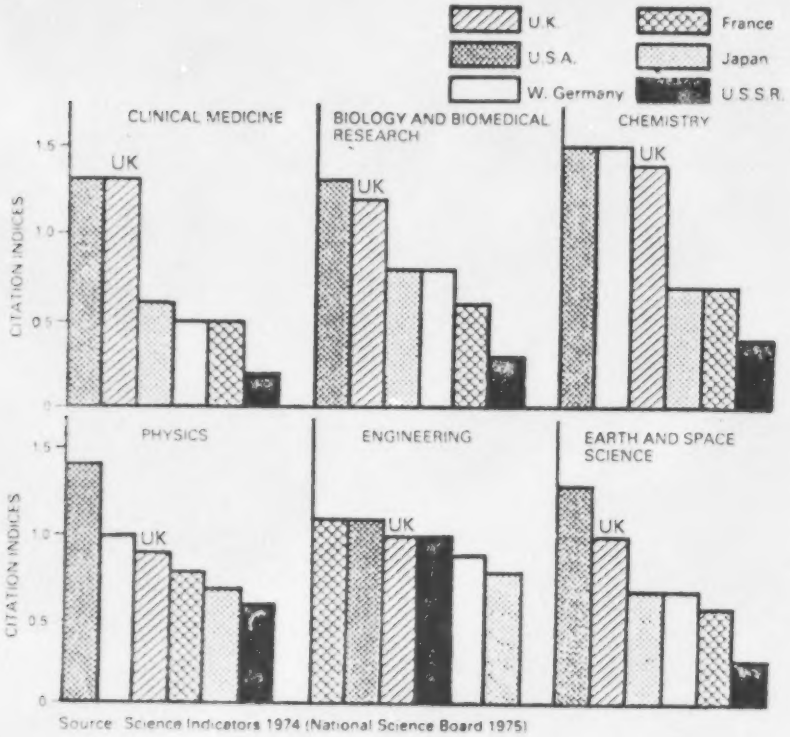


¹ After 1945, excludes the German Democratic Republic

Britain's Nobel Prize-winners number the highest per 10 million of population and nearly everyone of them was either trained by, or is one of the staff of, a British University or both (Figure 5.1).

Figure 5.2 (Reproduced from Dainton, 1979)

Citation indices of selected Scientific Literature by selected fields and countries 1973.

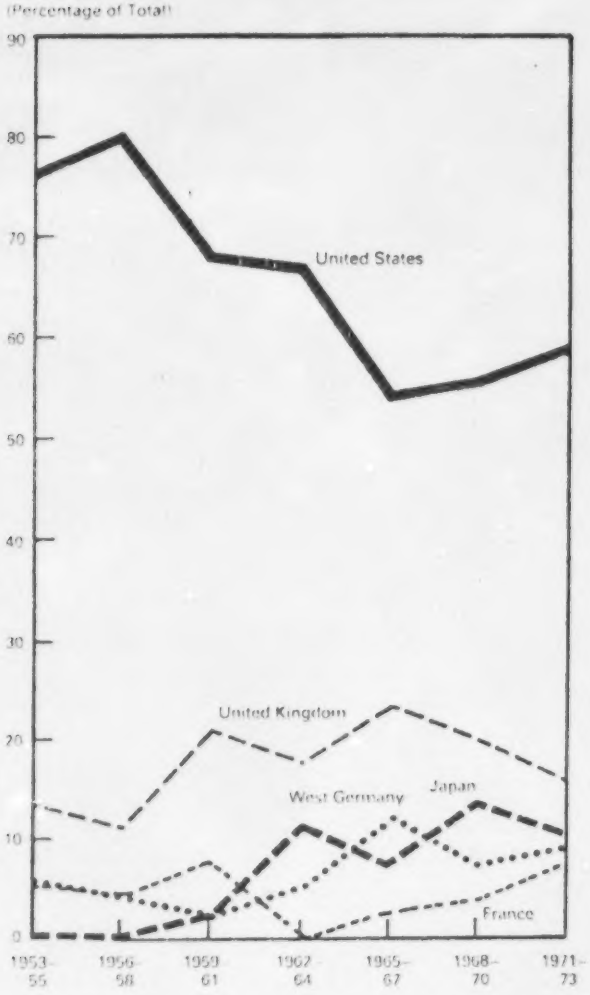


Source: Science Indicators 1974 (National Science Board 1975)

The citation indices for 1973 in selected fields and countries shows the United Kingdom was one of the leaders (Figure 5.2).

Figure 5.3 (Reproduced from Dainton, 1979)

Major Technical Innovations by selected countries 1953-1973.



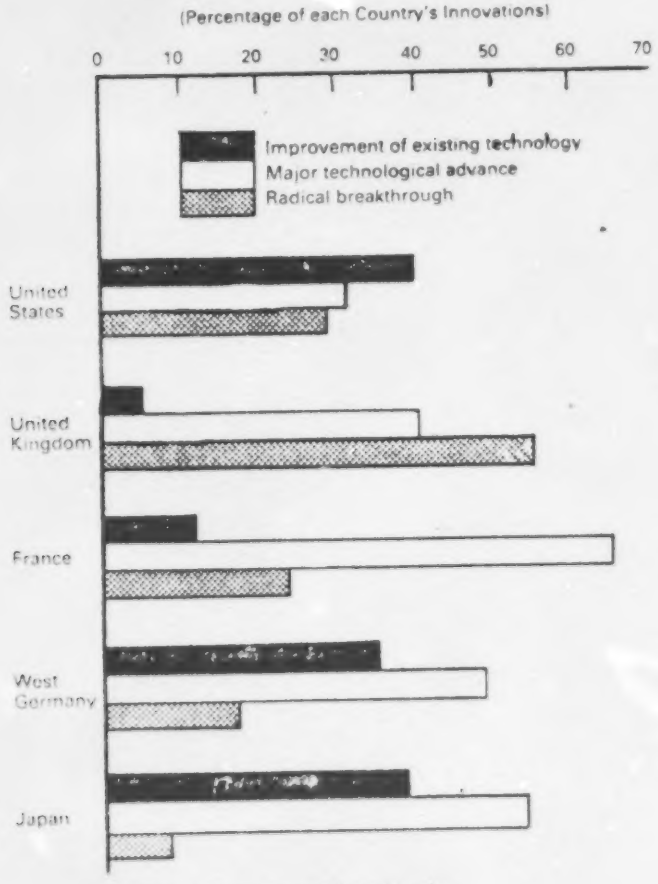
SOURCE: Gellman Research Associates, Inc.

Figures 5.3 and 5.4 show the standing of the United Kingdom in relation to major technological innovations and the radicalness of innovations.

Dainton (1979) goes on to point out that the education system in the United Kingdom has in the past produced many persons who were excellent in their field judged by international standards.

Figure 5.4 (Reproduced from Dainton, 1979)

Radicalness of Innovations by Selected Countries, 1953-1973.



SOURCE: Gellman Research Associates, Inc.

Excellence is a critical resource in the survival of institutions and staff should assess their contributions in those terms, because the major implication is that performance will be valued more in terms of economic standards than in terms of academic, human and social standards (French 1974, Kirschling 1978). One of the implicit messages today therefore, is that prescriptions now in common use may not be adequate for the 1980's and 1990's (Kirschling 1978).

It appears that excellence needs to be evaluated from the evidence presented. How then can it be done?

METHOD FOR EVALUATING EXCELLENCE

Firstly, the factors that might be used in the appraisal of departments, courses, teaching, research and students need to be identified. Secondly, once these factors are identified, what weighting should be given to different considerations in different circumstances? And finally, what should be done with the results?

Peer Evaluation

One of the most common methods used to evaluate centres of excellence in the United States and the United Kingdom has been by academic leaders, professors, university staff or a combination

of professors and university staff being asked which institutions they consider the most influential or educational programs of other institutions, at a national level (The Times Higher Education Supplement 1978, Taylor 1979, Halsey and Trow 1971, Halsey 1980 amongst others).

The survey done by Halsey (1980) suggests that university teachers, when asked where is the best department in your subject, found that Oxford was tops in English, French, History, Philosophy and Law, Cambridge in Geography, Biology, Maths, Physics and Chemistry, London School of Economics in Economics and Sociology and Imperial College in Civil Engineering and Electrical Engineering. Halsey suggests that the poll which was conducted in 1976 could already be out of date because excellent academic teachers who were in the top rating departments have since moved to other universities (Wilby 1979). When the present author challenged Professor Halsey as to how university teachers would know what was taking place in departments at other universities, he suggested that they may or may not know and could base their judgements on places where they spent their own student days, and this may have influenced them somewhat. One cannot assume a perfect knowledge and it is judgement or a partial judgement which has to be evaluated. He admitted that the judgements made were based on excellent academics such as Professor Fritz Ursell, the world's leading authority on ship hydro-dynamics, which got Manchester second place in mathematics. However, this

measurement is only a part of the evaluation process and must not be considered in isolation from other indicators.

Such as the question posed:-

"Which of the following posts would you be most attracted to personally?

(1) University lecturer and college fellow at Cambridge;
(2) Professor at Sussex;
(3) Professional head of a department at Leeds; or
(4) Reader in the University of London".

Most of the respondents chose (1), which, he says was another indication as to the dominance of Oxbridge.

The teachers judgements were probably based on publications produced by members of the top rating departments, in which case their research interests. Hartnett and others (1978) found in their efforts to assess the quality of doctoral programmes that the peer ratings were of the teachers employed in those programmes, reflecting primarily their research records and their publications.

Although peer evaluation is commonly used by universities and research councils, it does not yield a simple measure of scientific progress (i.e. outputs of research discussed in Chapter 4). The main difficulty of this method is the subjective nature of the evaluation which is based on the perceptions of others in the same field. The competitive nature of research with groups trying for prestige, resources and the recognition and acceptance of their ideas and theories, may effect the peer review (Martin and Irvine 1980).

Another problem with peer evaluation is that the evaluation of scientific contributions are related to the peers own research interests and activities, and judgements are made without having read the relevant publications of the research projects they are evaluating. They base their review on informal discussions rather than on actual contributions to scientific progress (Martin and Irvine 1980).

A final problem is that evaluation may suffer from the "halo effect" where scientific progress is evaluated more highly because of its association with a successful group or prestigious university, or because it has won prizes rather than on the work itself.

The relative importance of peer evaluation cannot be assumed to be insignificant. It is an indicator of scientific

progress and the problems associated with it can be overcome by:-

(1) Using a complete sample of peers or a large representative sample.
(2) If a divergence between expressed opinions and actual views is suspected, verbal surveys can be introduced.
(3) Peers must be assured of confidentiality
(4) Variations between different groups of evaluators must be checked (Martin and Irvine 1980).

Publications

Scientific progress can also be measured in terms of the number of publications produced by academics. Although several authors have made distinctions between quantity and quality of research contributions (Martin and Irvine 1980), Jauch and Glueck (1975) found in a study of professors' research performance in the natural and life sciences at one university, that simple counts of publications was the best objective measure of research performance and effectiveness. Most researchers and research department chairmen studied, did not believe that this was an effective measure, however. The authors recommend that a simple count of publications, modified by weighting the count by a journal quality index, would be the most effective method. This they say

could be accomplished by getting colleagues to agree on a list of quality journals and only the publications in these be counted. However, there is evidence that even the prestigous journals are not always discriminating (Lawani 1977). Attempts to attach a quality index to journals, therefore, fail to confront the problem of the wide variation in quality within each journal (Garfield 1972). Martin and Irvine suggest that a simple count of publications is not a measure of scientific progress but a partial indicator because firstly, each publication does not make an equal contribution to scientific knowledge and secondly, publications can be overcome by the use of citations and the choosing of matched groups producing similar types of papers within a single specialty.

Publication counts fail to 'distinguish between the fluency of genius and the loud noises of empty vessles' (Nature 1970). In an attempt to overcome this problem Matheson (1972) used citation counts to estimate the impact of publications and the interest they have aroused.

Citation Analysis

The Science Citation Index lists authors that are cited by the various published articles and papers. The Index is a valuable and powerful tool when used as an aid in literature searches (McGervey and others 1974).

Contrary to the Ortega Hypothesis, (which suggests that average scientists, working on relatively unambitious projects, make minor contributions, but that, without these minor discoveries by a mass of scientists, the breakthrough of the truly inspired scientists would not be possible) citation analysis suggests that only a few 'elite' (excellent and eminent) scientists contribute to scientific progress and a recognisable case can be made for citations representing an authentic indicator of influence (Cole and Cole 1972). The aim of citation analysis is that of injecting a quality factor into the evaluation of scientific publications (Martin and Irvine 1980). Kessler and Heart warn that any attempt to equate high frequency of citation with worth or excellence or low frequency of citation with lack of worth could end in disaster (McGervey and others 1974).

There are a number of problems with citation analysis but the effects can be minimised. The problems are:-

(1) Technical limitations

first author only listed

variations in names

authors with identical names

clerical errors

incomplete coverage of journals

(2) Variation of citation rate during the lifetime of a publication, with type of paper and specialty;

(3) Critical citations;

(4) 'Halo effect' citations; and

(5) Self and in-house citation.

These problems can be overcome by:-

- checking technical limitations,
- regarding citations an indicator of impact, rather than quality or importance, where impact is the actual influence on surrounding activities at a given time, quality is the property of the publication and the research described in it and importance refers to its potential influence on surrounding research activities. These factors cannot be measured in absolute terms or evaluated directly other than by peer evaluation which is subjective,
- choosing matched groups producing similar types of papers within a single specialty,
- checking empirically and adjusting results if self-citations and in-house citations varying between groups.

(Martin and Irvine 1980).

The difficulty to overcome the problems of citation counts as a measure of excellence in research have led Martin and Irvine (1980) to conclude that citation analysis is another partial indicator in the evaluation of science progress.

Other Possible Factors in the Evaluation of Research

Other possible factors that may be used in the evaluation are:-

- Nobel Prize-winners
- Major technical innovations
- Major discoveries
- Radicalness of innovations
- Honours and awards received
- Invitations to present papers
- Success in research grant funding
- Positions held in professional associations
- Papers presented at conferences
- Dissertations supervised.

Factors to evaluate course, students and teaching will be discussed later in the chapter.

Converging Partial Indicators

Irvine and Martin (1980) in their assessment of basic research suggest that a range of indicators must be employed to compare the excellence of different research groups. The three main factors they use are peer evaluation, publications and citation indices in only those cases where they provide convergent results to assess the scientific progress in Radio Astronomy.

Radio Astronomy

As indicated in Chapter 4 (Figure 4.2) scientific activity (input measures) at each radio astronomy centre was looked at before each of the partial indicators of scientific progress were considered. These included number of researchers, number of research students, number of researchers involved in teaching, number of effective researchers, annual running costs, annual costs per researcher, details of major items of equipment and number of support staff. Publications were analysed with respect to each centre, citations were calculated for each centre with self-citations and in-house citations identified, highly cited papers calculated and peer evaluations, consisting of interviews of scientific staff and a survey of rankings of each centre conducted.

The results showed that the Mullard Radio Astronomy Observatory at Cambridge was ranked first using the converging partial indicators' method comparing nine radio astronomy entries in different parts of the world (Irvine and Martin 1980).

Centres of Chemical Excellence

Matheson (1972) using the Science Citation Index for 1969 and 1970 and the Scientific Research in British Universities and Colleges for 1969/70 identified centres of chemical excellence.

From these sources, he calculated the following:-

- Number of publications in 1969;
- Average number of publications per staff member;
- Number of citations of 1969 publications in 1970;
- Average number of 1970 citations per 1969 publication;
- Percentage of self-citations;
- Average number of citations by others per publication; and
- Average number of citations per staff member.

From these results (see Table 5.1) he concluded that the true centres of excellence were the average number of citations per member of staff.

Table 5.1 Average number of citations per staff member

Department	Total number of citations per staff member	No. of citations by others per staff member
Leicester	15.6	10.8 a
University College	10.8	8.2
Southampton	10.1	7.5
Sussex	10.2	7.3
Essex	11.8	6.4
Imperial College	9.2	6.3 a
Reading	8.8	6.1 a
Sheffield	8.7	6.0 a

a, assuming 31 percent of citations are self-citations (Table 5)

(Reproduced from Matheson 1972)

The results however should be treated with caution because the period of time was restricted, the time gap between publication and citation was small, citation analysis as suggested has limitations by itself and active-crowded research fields have more citations than the esoteric disciplines (Matheson 1972).

Science Research Council

Based primarily on peer evaluation, the Science Research Council allocated £85,456,000 to universities for the year 1978/79. Of this total 54% was allocated to five committees or boards as shown in Table 5.2.

Table 5.2 Top Five Committees or Board 1978/79

1.	Astronomy Space and Radio	£13,181
2.	Chemistry	10,167
3.	Biological Sciences	9,311
4.	Physics	6,763
5.	Nuclear Physics	6,399
		£45,821
	Percentage of Total	54%

Source: Science Research Council Report 1978/79

The Committees and Boards in turn made allocations of which 54% was allocated to ten universities as shown in Table 5.3.

Table 5.3 Top Ten Recipients of S.R.C. Grants 1978/79		
1.	Imperial College	£7,080
2.	Oxford	6,545
3.	Manchester	5,831
4.	Cambridge	5,652
5.	University College	4,482
6.	Birmingham	4,410
7.	Glasgow	3,260
8.	Southampton	3,113
9.	Edinburgh	2,882
10.	Sussex	2,532
		£45,787
Total Universities		£85,456
% of Top Ten		54%

Source: Science Research Council Report 1978/79

Table 5.4 shows the top ten recipients of Science Research Council Grants by Boards or Committees for 1978/79.

Table 5.4 Top Three Recipients of S.R.C. Grants by each Committee or Board 1978/79

Board or Committee	UNIVERSITIES		
	Top	2nd Biggest	3rd Biggest
Science Board	York	Sussex	Edinburgh
Engineering Board	Queen Mary College	Bath	Sussex
Aeronautical & Mechanical Engineering	Imperial College	Southampton	Cambridge
Astronomy Space & Radio	Manchester	University College	Imperial College
Biological Sciences	Edinburgh	Cambridge	Oxford
Chemical Engineering & Technology	UMIST	Imperial	Leeds
Chemistry	Cambridge	Oxford	Southampton
Civil Engineering & Transport	Strathclyde	Newcastle	Liverpool
Computing Science	Edinburgh	University College	Newcastle
Control Engineering	Warwick	Imperial	Bradford
Electrical & Systems Engineering	Southampton	Edinburgh	University College
Energy Proposals	Cambridge	Imperial	Reading - Salford
Enzyme Chemistry	Oxford	- - - - -	- - - - -
Manufacturing Technology	Birmingham	Loughborough	Bristol
Marine Technology Programme	Manchester	Herriot-Watt	Glasgow
Material Science & Technology	Cambridge	Imperial	Oxford
Mathematics	Lancaster	Oxford	Imperial
Neutron Beam	Edinburgh	Oxford	Bristol
Nuclear Physics	Oxford	Glasgow	Birmingham
Physics	Imperial	Oxford	Sussex
Polymer Engineering Management	Imperial	Bradford	Liverpool
Science-Based Archaeology	Oxford	Bradford	Cambridge

Source: Science Research Council Report 1978/79

Table 5.5 Most number of times institutions appear in Table 5.4		
1.	London (Imperial, Queen Mary & University)	13
2.	Oxford	9
3.	Cambridge	6
4.	Edinburgh	5
5.	(equal) Bradford, Southampton & Sussex	3

It is quite interesting to note that in the poll Halsey (1980) conducted he found that the institutions getting the most votes are as shown in Table 5.6.

Table 5.6 The Dons' guide to the best universities		
	1.	London
equal	2.	Oxford
equal	2.	Cambridge
	4.	Edinburgh
equal	5.	Manchester
equal	5.	Glasgow

Source: The Dons' guide to the best varsities - Wilby (1979).

Tables 5,3, 5.4, 5.5 and 5.6 show that the same universities figure each time, which leads to the conclusion that the results of Halsey's (1980) poll was related to the quality of research output rather than the quality of teaching, which he himself suggested as well. It should be pointed out that the Social Science Research Council Grants were not included in the figures shown in Tables 5.2 to 5.5 whereas Table 5.5 includes other

disciplines not covered by the Science Research Council.

Another conclusion that may be drawn from these results is that peer evaluation and university teachers evaluation appears to be similar and related to research output. Similarly, Hartnet and others (1978) found ratings of doctoral programmes highly related to a number of research oriented variables of departments such as size, productivity, percentage of graduates holding academic positions at Ph.D granting universities.

It must be pointed out that a small percentage of eminent academics would be the same people in the Halsey survey and the Science Research Council, however, most of the teachers would not be involved with the Science Research Council peer evaluation.

MEASUREMENT OF PROGRAMME AND DEPARTMENTAL EXCELLENCE

The measurement of programme and departmental excellence is to improve both the teaching and research in institutions.

A survey of Ph.D students at the University of Cambridge between 1971 and 1975 showed that three out of five students in the humanities fail to complete their degree in six years (Geddes 1980 b). The Socia! Science Research Council in a survey of 1,837 research students found that only 10% of the 1973 intake completed their degrees in three years. Mr. Posner of the S.S.R.C.

suggested that institutions would need to evaluate their doctoral programmes with a view to improving them. (Geddes 1980a).

In response to dissatisfactions with reputational ratings, the Council of Graduate Schools and the Educational Testing Service conducted a multidimensional study of quality in doctoral programmes in three disciplines in the United States (Clarke 1976). The report suggested that the excellence of programmes can be evaluated using the characteristics shown in Table 5.7. The Table shows the characteristics of departments, students, resources and operations that are used for the evaluation of programmes. The information required for each characteristic is obtained from records and questionnaires (Downey 1978).

TABLE 5.7 DIMENSIONS OF QUALITY

CHARACTERISTICS	Source of Information			
	Records	Teacher Questionnaire	Student Questionnaire	Graduate Questionnaire
Department				
Academic training	X			
Research activity	X	X		
Research productivity		X		
Teaching effectiveness			X	X
Concern for student welfare and development			X	X
Improvement in programme		X		
Group morale		X		
Students				
Academic ability at entrance	X			
Achievements/knowledge/skills at time of degree completion	X			
Professional accomplishments of graduates				X
Judgements about programme quality			X	X
Satisfaction of various aspects of the programme			X	X
Group morale			X	
Resources				
Financial support for students	X			
Library		X		
Laboratory equipment and facilities		X		
Computer facilities		X		
Operations				
Purposes of the programme	X	X		
Programme offerings		X	X	X
Admission policy	X			
Faculty welfare	X	X		
Evaluation of student progress			X	X
Advisement of students			X	X
Programme leadership and decision making		X		
Job placement of graduates	X			
Student-department interaction			X	X
Research assistantships and opportunities for relevant student experiences	X		X	X
Degree requirements	X		X	X
Relationships with cognate programmes		X	X	X
Efficiency of degree production	X			

Source: Downey (1978)

The attractiveness of this method of evaluating excellence in programmes may be summarised as follows:-

- provides a systematic approach for the collection of considerable data that is related to the character and quality of a programme;
- it provides a good starting point and can be improved upon;
- the information is multidimensional
- the data can be tabulated in the same format for different disciplines and different institutions to enable constructive comparisons to be made between comparable institutions;
- different courses (such as humanities and sciences) can be compared against the same spectrum of data;
- changes in the quality of a course can be followed up, i.e. deterioration or improvement;
- strengths and weaknesses of courses can be identified so that decisions can be made to improve or abandon courses;

- allows for evaluation in all areas in a similar manner; and
- most of the work can be performed by the staff of the institution.

There are limitations and these are:-

- how is quality to be identified initially?
- how are specific criteria equated with quality?
  - quality in relation to goals and the kind of goals;
  - quality in relation to the outcomes of the programmes;
- can the criteria be used for Ph.D, masters and undergraduate programmes?
- can the criteria be used to assess the surviving of courses by other departments and the total graduate and undergraduate programmes?
- a large bank of normative data is needed to make comparisons (Downey 1978).

These characteristics were developed and used by Clarke and others (1976) to measure the quality of programs in Chemistry, History and Psychology at 25 institutions in the United States. They concluded "that it is possible to obtain much more extensive information about programme quality than is usually utilised and that it can be done without vast expenditure of time and money".

Comments on Some Programme Characteristics

Some of the characteristics suggested for the evaluation of excellence in programmes and departments are considered controversial and for these, some comments are justified.

The measurement of excellence in teaching is regarded as more difficult than the measurement of research (Appendix A). Although student evaluation of programmes and teaching is the most common (Aleamoni 1974), Rhodes (1976) suggests that students are not competent to evaluate teaching. In interviews, the present author was told that student evaluation of teaching and courses would be acceptable so long as it was not the only criterion used (Appendix A).

Admission policy and academic ability at entrance are criteria which are written and talked about more often than any other characteristic (UCCA Reports 1978, 1979, and Heap 1977). The 'A' Level results are generally used to offer undergraduate places at British universities. In addition, Oxford and Cambridge have special examinations and interviews. Some of the other universities include an interview in their selection procedure. Table 5.8 shows a summary of offers made to undergraduates on 'A' Level scores in selected subjects (Heap 1977). The points are calculated on the results a student obtains in the 'A' Level examinations. If a student gets two B's and an A then his

TABLE 5.8 OFFERS MADE ON 'A' LEVEL SCORES IN SELECTED SUBJECTS FOR BEST THREE SUBJECTS

	Civil Engineering	Electrical Engineering	English	French	History	Philosophy	Economics	Geography	Law	Sociology	Biology	Maths	Physics	Chemistry
ENGLAND														
Aston	5	5		9							7	6	5	4
Bath	6	8		11			9			9		8	6	7
Birmingham	8	9	10	11	10		10	11	12	9		9	8	6
Bradford	7	6		11			8	8		8	8	6		6
Bristol	9	10	8	11	8	8	12		12	10		12	8	10
Brunel		6					10		10	9	6	5	5	6
Cambridge	15	15	15	15	15	15	15	15	15		15	15	15	15
City	9	5					9			7		5		5
Durham			11	10	11	6	9	11	12	11	9	9	9	7
East Anglia			10	6	7		9	9	8	7		7	6	6
Essex		7	9	9	7	9	9				6		6	7
Exeter	10		11	10	8	6	10	11	11	6	9	5	6	7
Hull		10	10	8	9	8	8	9	10	10		6	8	9
Keele		9	7	7	8	8	8	8	8	10	6	5	7	5
Kent			8	7	7		7		10	7			6	6
Lancaster	4	6	10	10	10	9	7	9		9		8	5	6
Leeds	8	8	11	11	12	10	10	10	11	9		8	6	5
Leicester			10	8	9	9	9	10	9	9	8	6	5	6
Liverpool	7	7	11	11	10	6	9	10	10	9	7	7	5	5
London Kings	10	6	8	7	7	6		9	10		7	9	5	10
City	9						9							
University College	9	9					10	7	12		7		6	
Queen Mary	8	5	8	9	7		8	7	8		7	8	8	3
Imperial	6	9									7	8	6	6
Royal Holloway			11	10	6						6	7	7	5
Bedford			8	10	11			7		9		6		4
Goldsmiths			7	7	7			7		6			5	3
Chelsea											7			
Queen Elizabeth											9	6	7	10
SOAS					8			10						
LSE				9	6		10	10	11	10				
Westerfield				11	7						2	7	5	4
Loughborough	8	8		7			10			6	7	6	6	
Manchester	9	5	9	11		8	9	10	11	9	9	9	6	9
University of Manchester Institute of Science & Technology	7	8		9			8					7	6	6
Newcastle	9	6	11	8	10	11	9	10	11	8		8	6	7
Nottingham	9	7	11	10	10	10	11	11	10	9	9	7	8	7
Oxford			15	15	15	15	15	15	15	15	15	15	15	15
Reading		7	10	10	10	10	10	10	10	10	7	7	6	6
Salford	8	4	10	8			9	9		7		6	4	6
Sheffield	8	8	10	10	10	6	10	10	10	9	6	7	6	7
Southampton	9	10	10	6	7	7	9	10	10	9	9	7	7	9
Surrey	8	9		11							7	5	4	7
Sussex		7	10	9	11	9	9	9	11	9		7	5	8
Warwick	5	5	10	10	11	9	10		11	10	5	9	6	
York			11		11	9	9			9	10	10	7	9
WALES														
Aberystwyth U.C.			10	9	9	10	9	10	11	9		8	6	6
Bangor U.C.		5	10	6	9	7	7					5	5	4
Cardiff U.C.	6	6	10	10	10		9	11	10	9		7	7	7
St. David's Lampeter			11	9	9			9						
Swansea U.C.	5	8	11	9	9	7	7	9		10		6		8
Welsh National School of Medicine														
University of Wales Inst. of Science and Technology	8	4	6						11			6		7
SCOTLAND														
Aberdeen			9	10			9	5	9			5		
Dundee	5	5	7	10	7	7	7	7			5	5	5	4
Edinburgh		6	11	11	11	8	10	11		11	8	8	6	7
Glasgow	4	4	9	10	9	9		9	12	9		8	8	7
Heriot-Watt	4	8		11			8					8		6
St. Andrews			11	11	11			10				5	6	5
Stirling			6	6	6	6	6			6	6	6	6	
Strathclyde	4	6	9	9	9	9	9	9	10	9	4	5	4	3
NORTHERN IRELAND														
Queen's, Belfast	6	7	8	8	8	8	8	8	11	8		5	5	9
Ulster, Coleraine			9	9	8		9			7	6	5	6	6

Source: - Degree Course Offers 1977/78 - Heap (1977).

Result 'A' = 5 Points
Result 'B' = 4 points
Result 'C' = 3 points
Result 'D' = 2 points
Result 'E' = 1 point

points would total 4+4+5=13. The points are based on the best three subjects. In some cases students only attempt two subjects. There is a note of caution in the scores because many universities prefer not to publish their asking grades, it is possible that an offer shown in Table 5.8 may reflect the highest or lowest offer made by that department (Heap 1977).

In comparing the results of the Halsey survey (Chapter 3 and Table 5.8) a relationship appears to exist between departments. However, unless actual 'A' Level scores are made available by each university, no valid conclusions can be drawn as to the use of 'A' Level scores as an indicator in the measurement of excellence.

Employment and Research or further academic studies of first degree graduates are shown in Tables 5.9, 5.10 and 5.11. Table 5.9 shows for each of the years 1975/6 to 1977/78 the number of first degree graduates who obtained employment as at 31st December (column 1), the number believed to be unemployed, (column 2) and the percentage of the unemployed to the total. Table 5.10 shows the number of first degree students undertaking research or further studies and these shown as a percentage of total graduates from each university. Table 5.11 shows two additional ways of expressing the unemployment of first degree graduates. Dixon (1979) in drawing up in his figures includes first degree graduates whose whereabouts were unknown as at 31st December and

TABLE 5.9

FIRST DEGREE GRADUATES WHO GAINED EMPLOYMENT AND THOSE BELIEVED TO BE UNEMPLOYED AS AT 31ST DECEMBER

	1976			1977			1978			1976/78		
	GAINED EMPLOYMENT	UNEMPLOYED	% 2/1 + 2	SAME AS COL. 1	SAME AS COL. 2	% 5/4 + 5	SAME AS COL. 1	SAME AS COL. 2	% 8/7 + 8	SAME AS COL. 1	SAME AS COL. 2	% 11/10 + 11
	1	2	3	4	5	6	7	8	9	10	11	12
ENGLAND												
Aston	478	28	5.1	633	41	6.1	659	18	2.7	1770	85	4.6
Bath	463	28	5.7	492	24	4.7	552	37	6.3	1507	89	5.6
Birmingham	607	102	14.4	832	90	9.8	999	46	4.4	2438	238	8.9
Bradford	459	45	8.9	554	40	6.7	638	48	7.0	1651	133	7.5
Bristol	756	89	10.5	858	102	10.6	852	83	8.9	2466	274	10.0
Brunel	286	21	6.8	249	8	3.1	295	8	2.6	830	37	4.3
Cambridge	1155	83	6.7	1233	58	4.5	1119	49	4.2	3507	190	5 1
City	301	21	6.5	304	23	7.0	337	13	3.7	942	57	5.7
Durham	468	28	5.6	526	17	3.1	618	30	4.6	1612	75	4.4
East Anglia	284	61	17.7	349	84	19.4	403	101	20.0	1036	246	19.2
Essex	200	4	19.0	182	45	19.8	207	87	29.6	589	179	23.3
Exeter	415	50	10.8	439	29	6.2	611	37	5.7	1465	116	7.3
Hull	409	46	10.1	509	68	11.8	578	44	7.1	1496	158	9.6
Keele	178	45	20.2	249	52	17.3	237	32	11 9	664	129	16.3
Kent	280	43	13.3	300	43	12.5	372	46	11.0	952	132	12.2
Lancaster	237	38	13.8	390	87	18.2	459	68	12.9	1086	193	15.1
Leeds	626	81	8.9	922	97	9.5	1134	86	7.0	2882	264	8.4
Leicester	349	55	13.6	374	56	13.0	417	58	12.2	1140	169	12.9
Liverpool	821	77	8.6	874	41	4.5	901	53	5.6	2536	171	6.2
London	3754	582	13.4	3841	507	13.3	3500	302	7.9	11095	1471	11.7
Loughborough	561	38	6.3	576	23	3.8	772	36	4.5	1909	97	4.8
Manchester	1289	138	9.7	1398	125	8.2	1540	105	6.4	4227	368	8.0
Univ. of Manchester Inst. of Science & Technology	392	43	9.9	398	30	7.0	457	27	5.6	1247	100	7.4
Newcastle	717	67	8.5	845	76	8.3	899	40	4.3	2461	183	6.9
Nottingham	619	109	15.0	771	89	10.3	837	76	8.3	2227	274	11.0
Oxford	1171	54	4.4	1221	60	4.7	1414	59	4.	3806	173	4.3
Reading	524	79	13.1	636	38	5.6	645	75	10.4	1805	192	9.6
Salford	431	22	4.8	482	43	8.2	504	17	3.3	1417	82	5.5
Sheffield	686	49	6.7	736	66	7.7	902	61	6.3	2084	176	7.8
Southampton	582	22	3.6	732	56	7.1	801	46	5.4	2115	124	5 5
Surrey	353	24	6.4	341	17	4.7	387	11	2.8	1081	52	4.6
Sussex	327	65	16.6	417	63	13.1	427	71	14.3	1171	199	14.5
Warwick	320	90	22.0	431	81	15.8	622	67	9.7	1373	238	14.8
York	323	46	12.5	318	49	13.4	351	42	10.7	992	137	12.1
WALES												
Aberystwyth U.C.	232	48	17.1	275	60	17.9	238	52	14.9	805	160	16.6
Bangor U.C.	211	40	15.9	253	30	10.6	268	37	12.1	732	107	12.8
Cardiff U.C.	306	81	20.9	364	29	7.4	418	60	12.6	1088	170	13.5
St. David's Lampeter	38	13	25.5	48	19	28.4	77	8	9.4	163	40	19.7
Swansea U.C.	310	45	12.7	346	35	9.2	364	20	5.2	1020	100	8.9
Welsh National School of Medicine	127	—	—	175	2	1.1	160	—	—	462	2	0.4
Univ. of Wales Inst. of Science & Technology	307	50	14.0	300	8	2.6	329	22	6.3	936	80	7.9
SCOTLAND												
Aberdeen	456	28	5.8	423	11	2.5	588	18	3.0	1467	57	3.7
Dundee	259	14	5.1	324	25	7.2	289	19	6.2	872	58	6.2
Edinburgh	858	97	10.2	1021	94	8.4	977	95	8.9	2856	286	9.1
Glasgow	946	49	4.9	1156	46	3.8	1173	73	5.9	3275	168	4.9
Heriot-Watt	327	29	8.1	287	57	16.6	331	25	7.0	945	111	10.5
St. Andrews	201	44	18.0	241	38	13.6	264	41	13.4	706	123	14.8
Stirling	264	34	11.4	249	29	10.4	245	48	16.4	758	111	12.8
Strathclyde	609	42	6.5	726	55	7.0	729	98	11.8	2064	195	8.6
NORTHERN IRELAND												
Queen's, Belfast	474	114	19.4	561	92	14.1	680	49	6.7	1715	255	12.9
Ulster, Coleraine	172	26	13.1	166	25	13.1	236	25	9.6	574	76	11.7
TOTAL UNITED KINGDOM	27,118	3168	10.5	30287	3043	9.1	32867	2669	7.5	90372	8900	9.0

Source: Universities Statistical Records 1975/76, 1976/77 and 1977/78

TABLE 5.10

FIRST DEGREE GRADUATES UNDERTAKING RESEARCH OR FURTHER ACADEMIC STUDIES

	1976			1977			1978			1976/78		
	TOTAL GRADUATES	GRADUATES UNDERTAKING RESEARCH/ ACADEMIC STUDY	% COL 2/1	SAME AS COL. 1	SAME AS COL. 2	% COL. 5/ COL. 4	SAME AS COL. 1	SAME AS COL. 2	% COL. 8/ COL. 7	SAME AS COL. 1	SAME AS COL. 2	% COL. 11/ COL. 10
	1	2	3	4	5	6	7	8	9	10	11	12
ENGLAND												
Aston	789	98	12.4	948	91	9.6	1000	63	6.3	2737	252	9 2
Bath	695	54	7.8	675	64	9.5	824	97	11.8	2194	215	9.8
Birmingham	1538	157	10.2	1863	185	9.9	1898	187	10.0	5299	531	10.0
Bradford	764	80	10.5	802	85	10.6	956	100	10.5	2522	265	10.5
Bristol	1480	170	11 5	1583	147	9.3	1595	177	11.1	4658	494	10.6
Brunel	415	41	9.9	369	39	10.6	420	34	8.1	12 4	114	9.5
Cambridge	2571	410	15.9	2635	337	12.8	2566	376	14.7	7772	1123	14.4
City	451	41	9.1	468	37	7.9	524	42	8.0	1443	120	8.3
Durham	1025	126	12.3	1078	128	11.9	1151	120	10.4	3254	374	11.5
East Anglia	884	95	10.7	871	109	12.5	924	83	9.0	2679	287	10.7
Essex	502	104	20.7	478	93	19.5	623	130	20.9	1603	327	20.4
Exeter	908	102	11.2	935	102	10 9	1156	94	8.1	2999	238	9.9
Hull	985	94	9.5	1067	95	8.9	1158	85	7.3	3210	274	8.5
Keele	425	54	12.7	489	46	9.4	471	40	8.5	1385	140	10.1
Kent	676	71	10.5	674	61	9.0	883	89	10.1	2233	221	9.9
Lancaster	749	82	10.9	977	87	8.9	1017	82	8.1	2743	251	9.1
Leeds	1935	289	14.9	2025	264	13.0	2286	262	11 5	6246	815	13.0
Leicester	839	97	11.6	886	85	9.6	970	113	11.6	2695	295	10.9
Liverpool	1604	221	13.8	1586	170	10.7	1776	184	10.4	4966	575	11.6
London	8412	1055	12.5	8376	953	11.4	7673	1017	13.3	23873	3025	9.2
Loughborough	771	62	8.0	811	50	6.2	1164	79	6.7	2766	191	6.9
Manchester	2377	288	12.1	2375	274	11.5	2503	281	11.2	7255	843	11.6
Univ. of Manchester Inst. of Science Technology	685	113	16.5	664	99	14.9	760	106	13.9	2109	318	15.1
Newcastle	1395	163	11.7	1501	148	9.9	1597	189	11.8	44 3	500	11.1
Nottingham	1370	128	9.3	1493	138	9.3	1457	144	9.9	4310	410	9.5
Oxford	2503	420	16.8	2543	430	16.9	2687	453	16.9	7733	1303	16.8
Reading	1083	110	10.1	1139	86	7.6	1196	117	9.8	3418	313	9.2
Salford	852	124	14.5	926	91	9.8	938	117	12.5	2718	332	12.2
Sheffield	1532	193	12.6	1632	194	11.9	1721	156	9.1	4885	543	11.1
Southampton	1107	117	10.6	1292	129	10.0	1366	125	9.2	3767	371	9.8
Surrey	542	55	10.1	546	51	9.3	596	75	12.6	1684	181	10.7
Sussex	862	169	19.6	971	157	16.7	985	181	18.4	2788	507	18.2
Warwick	779	80	10.3	985	99	10.1	1208	121	10.0	2972	300	10.1
York	680	71	10.4	677	85	12.6	732	92	12.6	2089	248	11.9
WALES												
Aberystwyth U.C.	699	104	14.9	734	98	13.4	749	115	15.4	2182	317	14.5
Bangor U.C.	552	95	17.2	641	86	13.4	656	99	15.1	1849	280	15.1
Cardiff U.C.	870	127	14.6	1031	141	13.7	1062	124	11.4	2963	392	13.2
St. David's Lampeter	104	17	16.3	162	17	10.5	175	20	11.4	441	54	12.2
Swansea U.C.	742	98	13.2	730	77	10.5	784	76	9.7	2256	251	11.1
Welsh Nat. School of Medicine	129	——	——	184	0	——	161	0	——	474	——	——
Univ. of Wales Inst. of Science & Tech.	499	34	6.8	546	32	5.9	583	57	9.8	1628	123	7.5
SCOTLAND												
Aberdeen	1077	112	10.4	895	107	12.0	1117	122	10.9	3089	341	11 0
Dundee	476	47	9.9	546	53	9.7	530	42	7.9	1552	142	9.1
Edinburgh	1787	206	8.7	1920	215	11.2	1821	187	10.3	5528	608	11 0
Glasgow	1861	184	9.9	2033	183	9.0	2044	194	9.5	5938	561	9.4
Heriot-Watt	569	41	7.2	539	41	7.6	556	43	7.7	1664	125	7.5
St. Andrews	626	114	18.2	627	82	13.1	618	96	15.5	1871	292	15.6
Stirling	446	37	7.9	425	33	7.8	436	30	6.9	1327	100	7.5
Strathclyde	1152	84	7.3	1230	75	6.1	1320	74	5.6	3702	233	6.3
NORTHERN IRELAND												
Queen's, Belfast	1106	122	11.0	1174	123	10.5	1238	125	10.1	3518	370	10.5
Ulster, Coleraine	348	40	11 6	347	44	12.7	405	45	11.1	1096	129	11.8
TOTAL UNITED KINGDOM	57246	6990	12.2	60066	6618	11.0	63050	7062	11.2	180362	20678	11.5

Source: Universities Statistical Records 1975/76, 1976/77 and 1977/78

TABLE 5.11

FIRST DEGREE GRADUATES UNEMPLOYED AT 31ST DECEMBER

	A. DIXON - FINANCIAL TIMES (1) LEAGUE TABLE		TRIBE - UNIVERSITY OF DURHAM (2) *		
	% NOT EMPLOYED OR IN TEMPORARY U.K. WORK AT 31/12		1976/78		
	1977	1978	Graduates with known destination	Unemployed	Unemployed as a % of graduates with known destiny
ENGLAND					
Aston	5.9	3.7	2430	85	3.5
Bath	6.8	8.5	2040	89	4.4
Birmingham	10.0	7.4	4498	238	5.3
Bradford	9.8	10.9	2428	133	5.5
Bristol	13.8	12.6	4189	274	6.5
Brunel	4.8	3.7	1142	37	3.2
Cambridge	10.0	7.9	6063	190	3.1
City	10.1	5.0	1321	57	4.3
Durham	11.	12.8	3139	75	2.4
East Anglia	27.4	30.4	2198	246	11.2
Essex	17.8	19.6	1458	179	12.3
Exeter	12.8	11.2	2656	116	4.4
Hull	14.1	11.9	3032	158	5.2
Keele	22.3	14.3	1308	129	9.9
Kent	18.9	19.6	1811	132	7.3
Lancaster	23.3	19.4	2157	193	8.9
Leeds	12.7	11.4	5588	264	4.7
Leicester	16.7	14.4	2402	169	7.0
Liverpool	10.2	8.8	4448	171	3.8
London	14.6	10.9	31172	1471	4.7
Loughborough	6.5	7.6	2662	97	3.6
Manchester	11.5	11.6	7032	368	5.2
Univ. of Manchester Inst. of Science & Technology			2039	100	4.9
Newcastle	13.1	7.6	3991	183	4.6
Nottingham	13.2	12.6	3751	274	7.3
Oxford	8.0	8.8	7076	173	2.4
Reading	13.1	16.2	3097	192	6.2
Salford	8.1	5.3	2402	82	3.4
Sheffield	10.9	9.7	4300	176	4.1
Southampton	11.4	9.7	3424	124	3.6
Surrey	7.5	7.1	1558	52	3.3
Sussex	18.3	22.2	2438	199	8.2
Warwick	19.1	14.8	2600	238	9.2
York	16.5	16.5	1948	137	7.0
WALES	15.1	14.0			
Aberystwyth U.C.			2086	160	7.7
Bangor U.C.			1683	107	6.5
Cardiff U.C.			2655	170	6.4
St. David's Lanpeter			426	40	9.4
Swansea U.C.			2114	100	4.7
Welsh Nat. School of Medicine			467	2	0.4
Univ. of Wales Inst. of Science & Technology.			1422	80	5.6
SCOTLAND					
Aberdeen	7.5	10.1	2731	57	2.1
Dundee	9.7	8.8	1420	58	4.1
Edinburgh	14.6	14.0	4956	286	5.8
Glasgow	9.2	8.9	5765	168	2.9
Heriot-Watt	13.0	8.1	1597	111	7.0
St. Andrews	13 1	16.4	1639	123	7.5
Stirling	21.0	24.1	1261	111	8.8
Strathclyde	9.6	11.1	3502	195	5.6
NORTHERN IRELAND					
Queen's, Belfast	9.7	8.7	3312	255	7.7
Ulster, Coleraine	17.8	26.2	993	76	7.7

* Figures for Wales, Scotland and Northern Ireland were not completed by TRIBE.

Source: (1) Dixon (1979)
(2) TRIBE (1980)

treats them in the same way as traceable graduates. Tribe (1980) on the other hand excludes them completely

In these Tables the total picture for each university is shown. To enable valid constructive comparisons to be made, the figures for each university need to be dissected into the various disciplines. It is quite obvious that the universities which are predominantly biased to technological subjects, have the lowest unemployment of first degree graduates after six months, e.g. Aston, Bath, Brunel, Salford City, Loughborough. Similarly, the highest unemployment figures appear to be at universities biased towards arts and the social sciences, e.g. Essex, East Anglia, Lancaster, St. Andrews and Stirling. This would suggest that the demand for engineering graduates is high and a shortage exists (Finniston 1980).

First degree graduates who undertake further academic studies or research are found to exist in various institutions. In examining whether a relationship exists between unemployment and further academic studies or research it was found that taking the universities as a whole, no relationship appears to exist. However, some relationship may exist if the figures are broken down into disciplines.

It is quite apparent that employers like employing graduates from particular universities. Oxbridge and Fontainebleau are institutions who's graduates are in great demand (The Times Higher Education Supplement 1980 and Norman 1980).

Finally, the success, failure and wastage of students depends on a large number of variables. Miller (1970) suggests that academic performance appears to depend on ability, circumstances and effort and one or more of the following must increasingly be at fault if, as has been claimed by Woodhall and Blaug (1965), productivity of universities is decreasing:-

- selection, and the limited criteria which are applied in the selection process;
- the way schools prepare students for higher education;
- teaching methods in higher education;
- inflexibility of course arrangements and structure;
- examining;
- pass rates and examination procedures; and
- the manner in which institutions help their students.

Table 5.12 shows the total number of students who would normally have graduated and the number leaving before obtaining a degree. Table 5.13 shows the wastage rate for each university by faculty for 1952, 1955 and 1957.

TABLE 5.12

STUDENTS WHO LEFT WITHOUT HAVING OBTAINED A FIRST DEGREE BY TIME OF LEAVING

University	Number who would normally have graduated in 1965 - 1966 (1)	Number Leaving	% of Col. 1
ENGLAND			
Aston	495	144	29.1
Bath	125	35	28.0
Birmingham	1,255	121	9.6
Bradford	402	124	30.8
Bristol	1,110	108	9.7
Brunel	161	47	29.2
Cambridge	2,263	77	3.4
City	414	121	29.2
Durham	550	34	6.2
Exeter	569	65	11.4
Hull	769	62	8.1
Keele	241	26	10.8
Leeds	1,509	177	11.7
Leicester	590	62	10.5
Liverpool	1,240	117	9.4
London	5,048	707	11.0
Loughborough	473	161	34.0
Manchester	1,500	148	9.9
UMIST	617	76	12.4
Newcastle	1,135	113	10.0
Nottingham	988	102	10.4
Oxford	2,298	115	3.0
Reading	571	58	10.2
Salford	461	146	31.7
Sheffield	1,077	153	14.2
Southampton	600	65	10.2
Surrey	380	122	32.1
Sussex	422	31	7.3
York	216	28	13.0
TOTAL ENGLAND	27,479	3,346	12.2
WALES			
Aberystwyth	539	73	13.5
Bangor	445	52	11.7
Cardiff	645	78	12.1
Swansea	557	52	9.3
W.N.S.M.	65	1	1.5
TOTAL U. OF WALES	2,251	256	11.4
St. David's Lampeter	84	34	40.5
Welsh C.A.T.	172	47	27.3
TOTAL WALES	2,507	337	13.4
SCOTLAND			
Aberdeen	720	115	16.0
Dundee	442	50	11.3
Edinburgh	1,553	252	16.2
Glasgow	1,423	261	18.3
Heriot-Watt	238	80	33.6
St. Andrews	368	53	14.4
Strathclyde	656	194	29.6
TOTAL SCOTLAND	5,400	1,005	18.6
TOTAL GREAT BRITAIN	35,386	4,688	13.0

Source: Miller (1970)

TABLE 5.13

WASTAGE RATES OF UNDERGRADUATE ENTRANTS: BY FACULTY, UNIVERSITY AND YEAR OF ENTRY (GREAT BRITAIN).

PERCENTAGE OF STUDENTS FAILING TO GAIN DEGREES

	ARTS			SCIENCE			TECHNOLOGY		
	1952 entrants	1955 entrants	1957 entrants	1952 entrants	1955 entrants	1957 entrants	1952 entrants	1955 entrants	1957 entrants
University									
A	20	13	20	22	21	21	19	16	22
B	19	17	16	23	22	23	33	19	36
C	6	5	3	4	3	3	6	5	5
D	13	12	14	11	10	12	23	16	19
E	16	16	14	17	16	17	19	18	18
F	5	9	11	13	10	9	19	7	32
G	28	14	18	23	19	19	35	31	28
H	14	11	11	32	17	19	--	--	--
I	12	11	14	18	19	14	21	21	22
J	24	21	20	40	33	22	--	--	--
K	28	16	17	21	16	12	19	25	24
L	16	8	15	20	15	22	28	26	21
M	18	13	16	10	4	12	23	22	20
N	10	6	8	11	12	12	18	19	17
O	25	19	18	29	14	19	38	26	28
P	--	--	--	44	19	23	31	30	34
Q	25	22	10	--	--	24	--	--	--
R	10	12	11	20	17	13	18	18	22
S	14	15	11	22	22	20	33	24	9
T	7	10	11	11	12	9	40	22	14
U	34	12	8	56	25	28	--	--	--
V	19	11	9	12	17	17	--	--	--
W	38	18	19	44	30	26	--	--	--
X	7	8	8	6	5	4	7	14	11
ALL UNIVERSITIES	15	12	12	18	15	15	22	20	21

Source: Miller (1970)

The high wastage rates appear to exist in the universities with high percentage of students studying technological subjects, where the wastage is generally higher (Miller 1970). Again, before drawing any valid conclusions, a breakdown of wastage rates into disciplines would be a more appropriate way to make comparisons between universities.

Measurement of Departmental Excellence

Tek and others (1975) developed a tentative variable model for measuring excellence in engineering departments at the University of Michigan. Both tangible and intangible factors were considered and included the following concepts, which were thought to be relevant to the measuring of academic performance:-

1. Courses conceived or developed.
2. Research work undertaken.
3. Publications in the form of technical papers, books or book reviews.
4. Research proposals written and submitted.
5. Service to the college, university, community and nation.
6. Service to professional societies.
7. Outside consulting, lecturing and travel.
8. Number of doctoral students.

Other reports that were submitted by heads of departments included enrolments, current salary and equipment monies, personnel, teaching and support staff, support services, degrees awarded, teacher and course evaluations, equipment, space and others.

The input data consisted of student credit-hours taught, amount of funds used for teaching and research purposes, enrolment figures, teaching of small sections, the number of teaching and support staff, number of Ph.D candidates, number of technical papers published in refereed journals, number of published books, student evaluations, special service to the state, average fraction of teaching salaries and the total number of degrees awarded.

Weightings were given to academic performance, research performance, enrolments and degrees produced, e.g.

Published technical papers	-	1.0
Published books	-	5.0
Actual research	-	0.8
Porposed research	-	0.2

The programme consists of a series of algorithms, subroutines and specially formatted output commands which accept the input data, dimensionalise and normalise the various factors to account for size of departments and their fractional effect in the

university community.

The output summarises the input data, displays the dimensionalised, normalised and sorted values for the various terms and summarises all the factors for each department for comparisons to be made.

The authors suggested that although arbitrary weightings were chosen, the model was easily adaptable to allow analysis to take place on the various factors considered to ones that universally effect a department's final evaluation.

The ideal of excellence may be immeasurable in absolute numbers, its components are however, susceptible to fair comparisons across disciplines based upon common denominators (TEK and others 1975).

RESULTS

The results from the evaluation of excellence in research and teaching should at the present only be used as indicators to improve the education system, to maintain excellence where it is found, to strengthen departments that are weak, to identify non-essential departments, to identify academic deadwood and to further encourage the goal of excellence in higher education.

Barriers as to the measurement of excellence may become prevalent and for this reason the results should be discussed with institutions, departments, teachers and students.

SUMMARY

In this chapter the measurement of excellence was discussed and methods were suggested to evaluate the excellence in research and teaching. It must be pointed out that much more data are required and made available before further analysis and comparisons can be made. Results would require to be tested as to their validity in relation to the excellence of institutions and departments and in particular the multidimensional comparisons between multidisciplines.

Further research is needed into the measures of excellence in institutions of higher education to enable more reliable results to be obtained and be used constructively rather than destructively.

Chapter 6

RESOURCES, MANAGEMENT AND GOVERNMENT

- Introduction
- Resources
  - University Grants Committee
  - Allocation of Resources by UGC
  - Income
  - Research Councils
- Planning and Resource Management
- Reallocation of Resources
- Programme Evaluation
- The Role of the State
- Summary

RESOURCES, MANAGEMENT AND GOVERNMENT

Introduction

For universities in the United Kingdom to maintain the highest standards of excellence in teaching and research for the advancement of knowledge, resources are required. At present, resources are limited in the United Kingdom with many claims to them (Boyson 1979). The Government contributes the majority of the resources required for higher education in the university sector (76% see Table 6.1) through the University Grants Committee (Department of Education and Science 1979).

The relationship between the universities, Government and University Grants Committee will be analysed with the excellence in teaching and research.

RESOURCES

The universities are financed mainly by the Government through two sources, the University Grants Committee and the Research Councils (Merrison 1980).

University Grants Committee

Prior to World War I, universities were financed in the main

by endowments and public subscriptions, and received little from the State.

In 1919 the University Grants Committee (UGC) was established.

"To enquire into the financial needs of university education in the United Kingdom and to advise the Government as to the application of any grants that may be made by Parliament to meet them". The amount of finance available since 1919 for universities is shown below for selected years:-

1919	£1 million
1938-39	£2 million
1962-63	£129 million
1978-79	£619 million (recurrent grant)
1978-79	£41.6 million (equipment grant)
1978-79	£17.01 million (building programme)

(James 1975, Robbins 1963 and UGC 1979).

The terms of reference for the UGC changed in 1946 and the following was added to the 1919 reference:-

- "to collect, examine and make available information on matters relating to university education at home and abroad".

- "to assist in consultation with the universities and other bodies concerned, the preparation and execution of such plans for the development of the universities as may from time to time be required in order that they are fully adequate to national needs". (Owen 1980)

The role of the UGC is to provide a buffer and a link between the universities and the Government (James 1975). Its role has to be seen against more general social trends such as the pervasive weakness of education in general and of higher education in particular as a public priority, the apparent endless cycle of economic crises and the growing parliamentary interest in greater accountability. Although the system has become more complex and controlled, in comparison, the British system is still freer than any known alternative (Scott 1978).

Recurrent and non-recurrent grants are made available by the government to the UGC annually, for distribution to universities. Previously, recurrent grants were allocated on a quinquennial system which was abandoned in 1977 (UGC 1978 and 1979).

Although the government sets broad guidelines for the UGC, the universities in the United Kingdom are given block grants to be used as they wish. In the early 1960s special grants were

made available to Imperial College to be set up as a centre of excellence in science and technology, to improve the quality of British engineers relative to the excellence of the Germans and the Americans (Appendix A).

In spite of recent cutbacks in finance, the UGC has been able to give universities protection from excessive Government interference.

Allocation of Resources by the UGC

The UGC allocate resources to universities based on a number of factors and excellence is one of these. Specific grants are allocated to universities to build up weak departments or strengthen good departments in selected institutions and this grant is included in its annual block grant. This method of allocating funds was to steer the system in a certain direction to enhance excellence in teaching and research (Appendix A).

The UGC have found it extremely difficult to allocate resources to universities in the present environment of cutbacks and uncertainties. In 1977 the quinquennial was abandoned and replaced with a rolling triennial system where provisional allocations are adjusted annually. This too has now been abandoned and replaced with annual grants to the UGC through the Department of Education and Science (David and others 1979).

For 1980/81 the UGC was given a month by the government to decide allocations for universities (Appendix A).

An environment such as this is not conducive to effective and efficient management of resources both in the short and the long term; and is not conducive to the pursuit of excellence (Appendix A).

Income

Table 6.1 shows the total income of all universities in the United Kingdom and the percentage of total income received by way of Exchequer grants, research grants and contracts and other income. The majority (76%) of income is received by way of Exchequer grants.

One element that may be used in the evaluation of excellence is the percentage of total income received or earned by way of research grants and contracts. The top five universities are (Appendix A):-

	(1)	Oxford	19%
	(2)	Sussex	18%
	(3)	Cambridge	17%
	(4)	Birmingham	16%
equal	(5)	Southampton	15%
equal	(5)	York	15%

TABLE 6.1

SUMMARY OF INCOME FOR THE YEAR 1975/76

	Total Income(1)	PERCENTAGE OF TOTAL INCOME		
		Exchequer Grants (2)	Research Grants and Contracts (3)	Other Income (4)
		%	%	%
Aston	10,239,265	83	5	12
Bath	6,092,132	82	6	12
Brimingham	23,961,970	74	16	10
Bradford	10,205,614	83	6	11
Bristol	17,311,356	77	14	9
Brunel	6,668,355	82	8	10
Cambridge	27,780,518	70	17	13
City	7,249,644	82	6	12
Durham	8,037,961	81	7	12
East Anglia	7,243,525	79	10	11
Essex	5,217,581	80	11	9
Exeter	7,859,849	80	7	13
Hull	8,182,270	84	6	10
Keele	5,081,728	85	4	11
Kent	5,902,201	81	8	11
Lancaster	7,415,506	80	7	13
Leeds	23,427,753	78	11	11
Leicester	8,155,037	80	10	10
Liverpool	19,544,692	82	9	9
London University	155,612,298	73	14	13
Loughborough	8,041,901	77	8	15
Manchester University	29,425,261	74	12	14
Manchester Inst. of Science & Technology	10,639,561	83	8	9
Newcastle	17,677,166	76	12	12
Nottingham	14,910,325	75	13	12
Oxford	29,413,022	65	19	16
Reading	11,958,093	77	11	12
Salford	9,760,093	86	5	9
Sheffield	17,041,877	81	9	10
Southampton	14,878,722	70	15	15
Surrey	7,424,053	81	9	10
Sussex	10,098,101	71	18	11
Warwick	7,568,691	77	10	13
York	6,010,337	74	15	11
TOTAL ENGLAND	565,037,048	76	12	12
TOTAL WALES	40,032,106	79	10	11
Aberdeen	14,063,916	79	7	14
Dundee	8,663,898	85	8	7
Edinburgh	27,131,682	73	13	14
Glasgow	23,706,512	79	11	10
Heriot-Watt	5,367,309	82	7	11
St. Andrews	6,322,356	85	5	10
Stirling	4,654,132	86	6	8
Strathclyde	13,374,551	78	11	11
TOTAL SCOTLAND	103,284,356	79	10	11
TOTAL GREAT BRITAIN	708,353,520	76	12	12
Queen's University, Belfast	14,108,614	82	7	11
Univ. of Ulster, Coleraine	4,111,085	87	5	8
TOTAL NORTHERN IRELAND	18,219,699	83	6	11
TOTAL UNITED KINGDOM	726,573,219	76	12	12

Source: Department of Education and Science (1979)

Further information is required before it could be suggested that the institutions listed above are centres of excellence. The income each university gets, needs to be dissected and shown in departments and then each discipline can be compared. Also, some of the exchequer grants are used for research purposes and this would be extremely difficult to dissect not only between departments, but between research and teaching as well (Appendix A, Robbins 1963).

Research Councils

The government makes available funds for the research councils annually to distribute to institutions both in the United Kingdom and overseas. The method of allocation has been discussed in Chapter 4 (Science Research Council 1979).

Both the Science Research Council and the Social Science Research Council have stated they will support excellence in research identified with the national interests of the United Kingdom. The Social Science Research Council prefer to support applied research more than basic, so long as the project is of a high quality (Science Research Council 1979 and Social Science Research Council 1979).

Cutbacks in funding have curtailed the activities of the research councils.

The Science Research Council has been forced to reject research projects of a high quality which would normally be accepted and funded (McKie 1980a).

In addition to research grants, the research councils make available studentships both on a quota and central pool system. These grants are made available to postgraduate students for further education and research. The Science Research Council approved 6,100 studentships to all the sectors for 1978/79 and of these 40% were allocated to the following ten universities:-

(1)	Cambridge	400
(2)	Oxford	342
(3)*	Imperial College	333
(4)	Manchester	255
(5)	Leeds	247
(6)	Birmingham	183
(7)	Aston	174
(8)	Southampton	169
(9)	Liverpool	167
(10)	Bristol	165

* London received a total of 841 studentships. (Science Research Council 1979). It will be evident from the above that the same universities appear to get the bulk of the studentships and research grants. This is to be expected as a relationship

exists between research grants and studentships (Science Research Council 1979).

A difficult area in research is considered to be in multi-disciplinary and inter-disciplinary research. Although a joint SRC/SSRC Committee was established following the Swann Report in 1968, the Committee stated, "There are all too often institutional barriers to collaboration between academic staff from different departments" (SRC and SSRC 1979).

The Social Science Research Council designated research centres for multi-disciplinary projects to foster this kind of research (Barry 1980). These projects have been approved for a number of years in an environment of limited resources, thereby, jeopardising future excellent research projects. Also, the designated centres are not considered centres of excellence (Appendix A).

PLANNING AND RESOURCE MANAGEMENT

Managing resources under conditions of decline is a concept foreign to institutions in higher education experienced in an era of comparalleled growth. Yet that is the prospect facing administrators for the remainder of this century (Kaiser 1976). Although planning was not really necessary as long as the resources available to higher education were abundant and growing

it is certainly essential under conditions of decline (Massey 1975).

Planning has three basic elements, strategic, operational and budget. The concept of planning in an activist role by the central administration of a university was viewed as unnatural, if not suspect. Although that attitude is beginning to change considerable apprehension still exists.

There are numerous ways universities manage resources allocated to them from the UGC for recurrent purposes. The financial planning and management of universities usually follow seven concepts (Bachetti 1978):-

(1) Every Tub On Its Own Bottom - this system recognises the various clearly defined expenditure and revenue centres and then requires that each budget centre generate enough revenue to offset its major direct expenditures and to cover a share of the indirect costs. (e.g. Harvard University).

(2) The King's Decree - in this mode the total revenue available is allocated to the various departments by the central administration under the Vice-Chancellor's or Central Administrative group directive, with or without consulting various advisors.

(3) The Squeaky Wheel Gets The Grease - this method is usually found in universities which do not have systematic budgeting and goal-setting procedures. The administration may be weak and indecisive or it may be strong and capricious. In either case the annual revenue pool is attacked by the head of each department with a view of securing the maximum allocation independent of its true need.

(4) The Formula - this method makes allocations on one of the following units:-

(a) student credit hours

(b) student contact hours

(c) full-time equivalent students

(d) full-time equivalent faculty

(e) full-time equivalent employees

(f) total salary expenses

(g) assignable square feet of physical space.

(5) Planning Programming and Budgeting System - there are three major steps in the process, Planning, Programming and Budgeting with seven identifiable characteristics:-

(a) identification of goals

(b) definition of objectives

(c) programme description to accomplish objectives

(d) an extended time frame

(e) explicit consideration of alternative approaches

(f) evaluation of all approaches and selection of the best route, and

(g) replanning.

(6) Zero-Base Budgeting - a process that requires each head of department to justify his entire budget in detail, just as though it were being started for the first time. There are three basic steps:-

- describing institutional activities into units which can be considered functionally discrete, called decision packages;
- evaluate these decision packages objectively and subjectively; decision packages are ranked on the basis of this evaluation; and
- allocate available funds accordingly.

(7) Convergence Budgeting - the principal objective in convergence budgeting is to reconcile central and local needs, opportunities, and constraints. This is accomplished through a dialectical process in which financial conditions and institutional goals take turns serving as context for one another. Considerable skepticism exists about the ability of such a system to function in adverse financial conditions (Bachetti 1978).

These alternative budgeting concepts have been in use either in their entirety or in various mixes among themselves or with other budgeting concepts. Each institution must be able to select the concept most appropriate to its decision-making process and to its achievement in the pursuit of excellence in teaching and research. Each concept has its limitations and benefits, and selection depends upon the aims and objectives of the university and higher education (Bachetti).

There are four angles of approach in the function of planning and apply wherever one might be in the planning process:-

(1) Conceptual Structure

(2) Tools and Techniques

(3) Administrators

(4) Process

While these four central themes can be expressed separately, in practice they are working partners. A technique to have value must reflect all these themes. It must reflect an intelligent and conceptual structure, be carried out by people who are open-minded and generate a process which encourages and rewards thoughtful participation. Through their interweaving they produce a result richer, more coherent, and more powerful than it would be if any of them failed or were ignored (Bachetti 1978).

The angles of approach come to life in the following topics:-

(a) The institutions economic context both internal and external;

(b) Institutional characteristics;

(c) Purposes of the institution both stated and revealed;

(d) Meaning and information such as relations of theories to facts and accountability;

(e) Models of decision-making;

(f) Communications; and

(g) Participants, their motivation, rewards and professionalism.

In many universities the planning process is incremental, relatively informal and highly decentralised. This process has been extraordinarily effective in developing teaching and research programmes of very high quality. Academic excellence can be enhanced or even maximised this way. But the process generates organisational slack. Universities must be concerned with efficiency as well as effectiveness in the years to come. That is the essence of the current stress on accountability in higher education. The problem is to find a way to be reasonably efficient without sacrificing overall effectiveness, such as the qualitative aspects of teaching and research (Massy 1975, Higher Education Review 1979, and Times Higher Educational Supplement 1979).

A model that needs to be developed to meet these challenges should include the re-examining of the base budget and tradeoffs. The motion of tradeoff is critical; when one item is 'pushed-in' somewhere in the system the requirement to balance the budget causes something to be 'pushed out' somewhere else. Quantifying these relations is a major object of modelling (Massey 1975).

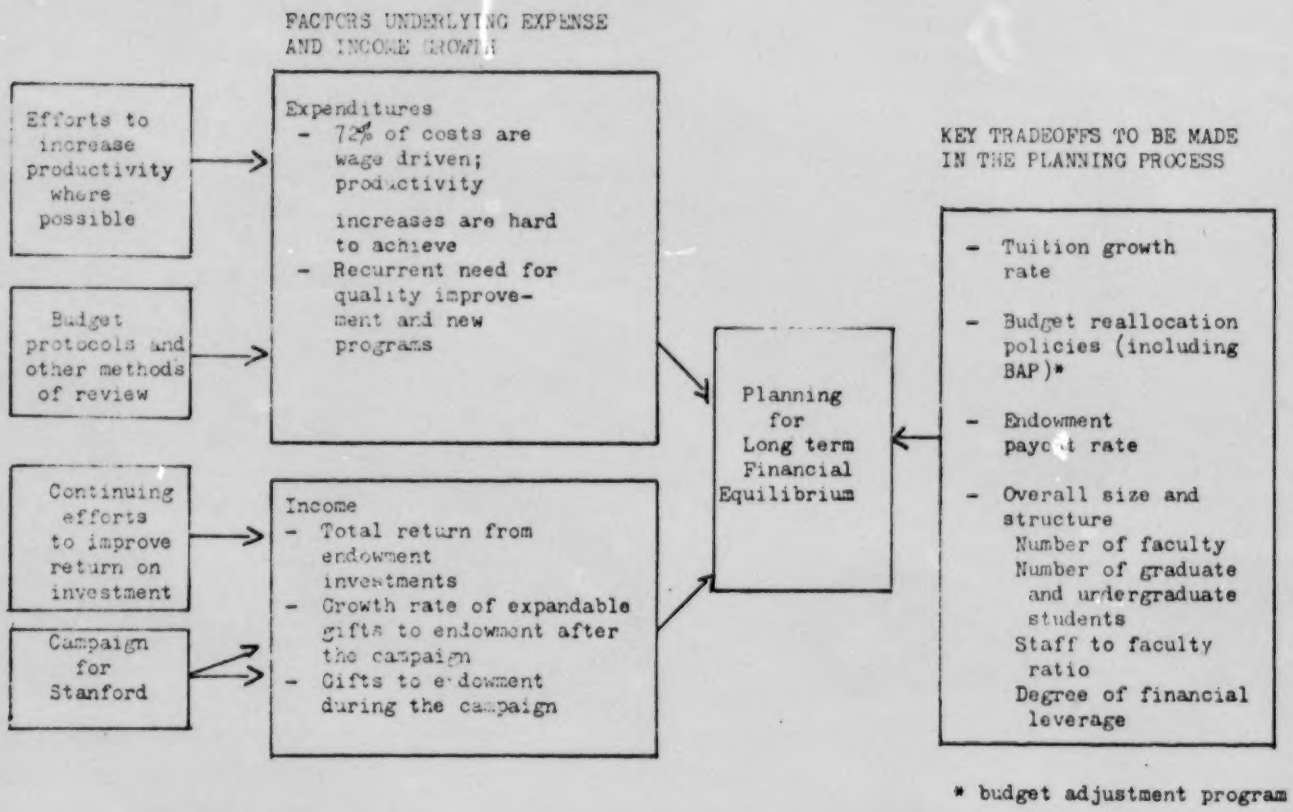
Stanford University (Massy 1975) developed a successful model shown in figure 6.1 for long-term financial equilibrium. The success of the computerised model is evidenced by the fact that in five years from 1970 the institution has cut $8 million out of the budget base with little serious effect on academic programmes (Massy 1975).

The impact and success of the model was due to the following:-

(1) The model made possible greater participation in the planning process by members of the institution, and provided a useful input;
(2) All variables were brought together in the same conceptual package;
(3) It was possible to establish and agree on a realistic target for long-term financial equilibrium;
(4) It is possible to do sensitivity analysis on key parameters;

FIGURE 6.1 (REPRODUCED FROM MASSY 1975)

Outline of Long-Range Financial Planning System


FACTORS UNDERLYING EXPENSE AND INCOME GROWTH
Efforts to increase productivity where possible
Budget protocols and other methods of review
Continuing efforts to improve return on investment
Campaign for Stanford
Expenditures
- 72% of costs are wage driven; productivity increases are hard to achieve
- Recurrent need for quality improvement and new programs
Income
- Total return from endowment investments
- Growth rate of expandable gifts to endowment after the campaign
- Gifts to endowment during the campaign
Planning for Long term Financial Equilibrium
KEY TRADEOFFS TO BE MADE IN THE PLANNING PROCESS
- Tuition growth rate
- Budget reallocation policies (including BAP)*
- Endowment payout rate
- Overall size and structure
Number of faculty
Number of graduate and undergraduate students
Staff to faculty ratio
Degree of financial leverage

* budget adjustment program

(5) It is easy to run the model when data changes and makes the budget-balancing responsive to changing conditions and assumptions;

(6) The institution is viewed as an integrated whole and makes centralised financial and institutional planning necessary because the decision of one department can have a profound effect on others;

(7) Bringing out the first human intellect in teaching or research requires a reasonably stable environment; and

(8) The model played a key role in furthering effective decision making and effective participation (Massy 1975).

REALLOCATION OF RESOURCES

University finances have become something of a zero-sum game where real growth in one area means a real decline elsewhere; thus the sum of the changes is zero.

Recently, the University of Oaklahoma decided to conduct an extensive self-evaluation of programs. In addition, each department was required to rank programmes in order of priority

with a view of eliminating weak ones and strengthening good ones. The budgets for five years were cut to retain amounts which were called 'excellence monies'. These were then reallocated using the following criteria agreed to by departments:-

- centrality of the programme to the mission of the university;
- productivity of the programme;
- demand for the programme;
- resources used by the programme;
- vitality of the programme; and
- uniqueness of the programme.

The result of this evaluation has created opportunities for (1) greater participation, (2) what programmes ought the university to be doing (3) serious attention to regular evaluation and modification of programmes, (4) encouragement of greater communication and (5) purposeful coordination and recognition that it is impossible to move massive blocks of money around in universities. Although the process did have some casualties the process has been beneficial in that people are now aware that monies are available only if they can build a cogent case in such a way that both the person and institution may benefit (Robl and others 1976).

PROGRAMME EVALUATION

An evaluative process is required by institutions to consider the closing down of departments in an environment of financial stringency. There are no simple set of guidelines nor any single criterion which in and of itself will determine whether an academic programme should be undertaken or continued. There are a number of which must be met in the evaluation of an academic programme; not one of them is by itself sufficient. The four principal elements that enter a decision about a programme are:-

(1) Is it academically important?

(2) Is there now, and will there remain, enough student interest to warrant its continuance?

(3) Is there a high probability that the programme will achieve a level of excellence?

(4) Can the programme be adequately and securely financed?

The University Grants Committee (1979) commissioned the Atkinson Report on Russian Studies in British Universities because of falling student demand. The recommendations have not been universally welcomed (Owen 1980, Times Higher Education Supplement 1980a and AUT 1978).

The report set out the reasons to justify their proposals for rationalising Russian studies and may be summarised as follows:-

- wasteful and academically unsatisfactory use of resources;
- large number of small units uneconomic;
- advantages of large groups -
  - courses of wider scope
  - more favourable atmosphere for research
  - closer links between language and non-language work
  - better use of library resources
  - improved opportunities for study leave
  - greater effective weight in the local allocation of resources
  - more teaching and administrative resources.

Salford University had already decided to discontinue the teaching of Russian.

The Association of University Teachers (1980) put out a statement on rationalisation and suggested that concentration of research and teaching into a small number of 'centres of excellence' has never actually significantly increased excellence and only produces narrowness, over-specialisation and inflexibility.

However, if some positive action is not taken ailing departments will endanger whole institutions in their pursuit of excellence in teaching and research and reduce them to mediocrity (Williams cited by O'Leary 1980). Use could be made of teachers by contracting them out or redeploying them in other areas or introducing early retirement plans.

Cambridge University's General Board of the Faculties have recommended that the departments of geodesy and geophysics, geology, and minesology and petrology, should be merged into one department and will mean a more efficient use of resources for both research and teaching (THES 1980).

It should be pointed out that any mergers and phasing out of unviable departments in a time of great financial pressure needs to be based on the concept of long-run financial equilibrium. The challenge to planning is not just to alleviate the current pressures, but to assure that the traditions of independence, creativity and intellectual excellence survive if not prosper during the year ahead (Massy 1975).

An institution should be extremely careful when eliminating departments programmes or sections and assure itself that the decision is based on all the information available. Appropriate discussions and meetings should be held to make absolutely sure that all the consequences are fully examined (Miller 1975).

The words of Oliver Goldsmith (1728 - 1774), although used in the context of a man, are also appropriate for an institution:-

> "We must touch his weaknesses with a delicate hand. There are some faults near allied to excellence that we can scarce weed out the fault without eradicating the virtue".

THE ROLE OF THE STATE

The Government is the major contributor to University resources (76% - Table 6.1) and continues to lay down broad lines of policy through the University Grants Committee about the most desirable lines of development. It is unlikely however, that government controls such as that existing in overseas countries will be introduced in the United Kingdom. Universities have always had a special relationship with the state. Universities depend upon authority for its power to confer degrees, and in modern times that authority has normally been the national government (Caine 1969).

Academic self government is strongly entrenched in the universities and the research councils, either constitutionally or by custom.

Mrs. Margaret Thatcher, the Prime Minister, when the Secretary of State for Education and Science, in her evidence to the Select Committee appointed to consider Science and Technology stated that she regarded the work of the research councils as 'vital', she was satisfied with the way they were carrying it out and that she recognised that it may be necessary to retain the independence of the scientific advice they provided and the assistance they can give towards the solution of individual departmental problems. In relation to the Department of Education and Science and the research councils, Mrs. Thatcher said:-

> "We do not interfere in any way with the judgements of the separate research councils as to what work they pursue .... in theory we have powers within the charter of the research councils to give them directions. It is obviously a power which one would use sparingly bearing in mind that we would thereby be overriding their scientific judgement which one would think twice about doing" (Select Committee on Science and Technology 1971).

The main criticism of government in the area of higher education is the failure at a time of financial crisis to give

adequate notice of its intention - a failure which has given rise to all sorts of frustrations and inefficiencies, rather than on any inequity in their distribution and administration (Robbins 1980).

The role of government in higher education has been changing as the competition for resources gets fierce (Times Higher Education Supplement 1979). Society in general are questioning the large amounts being allocated to universities for the education of the ablest youths who cannot find adequate use of the knowledge they have acquired (Dixon 1979). However, Irvine and Martin (1980) show that even though the knowledge may not be directly used in particular disciplines, there are spin offs in technology and manpower training from graduates in Radio Astronomy.

There is no evidence to show that the Government, through their financing patterns encourage or facilitate the recruitment of students of high quality, or the maintenance of programmes that can accommodate such students. Diversity, quality and excellence will remain largely at the mercy of the educational marketplace unless government attitudes about financing higher education change (Lawrence 1977).

Financing of higher education by Government will need to change in order to give the most ablest students the maximum opportunity to enter universities. Student aid policies, that will encourage or facilitate the recruitment of students of high

ability or maintain programmes that can accommodate such students, need to be revised (Robbins 1980).

Government can also seek to subsidise special institutions to maintain high quality programmes in research and teaching (Lawrence 1977), such as that recommended by Finniston (1980). It is acknowledged that the process of selection of such institutions would be extremely difficult. Those institutions who do not show evidence that improvements in efficiency, effectiveness and relevance are being made in programmes, should not share in special grants that could be made available for institutions accomplishing excellence (Lawrence 1977).

SUMMARY

This chapter has discussed resources, management and government in universities. Resources allocated, through the University Grants Committee and the Research Councils, by the Government were considered to be inadequate to enhance excellence in teaching and research. Improvements in financing higher education was suggested through student aid and special grants. However, universities would have to show evidence that there is improvements in the quality of their programmes. At the present, the resources available to universities have been cut back and reallocation of these resources can only be considered by eliminating weak programmes and supporting strong and excellent ones.

The efficient and effective use of resources was suggested as a long-term priority rather than a short-term one.

Chapter 7

CONCLUSIONS AND RECOMMENDATIONS

- Conclusions
- Dilemma and Shortcomings

CONCLUSIONS AND RECOMMENDATIONS

The main objective of this disseration was to study 'Centres of Excellence in British Universities'.

From the early history of higher education it was obvious that 'centres of excellence' did exist in Athens, Rome, Oxford, Cambridge, Paris and Germany among others. Throughout the ages and to the present day the aims of higher education and a university have not changed much. One of the primary aims has always been the pursuit of excellence in teaching, research, public service or any other higher educational activity. "Any Institution that does not strive for excellence will drop to mediocrity.

It was found that excellence had a number of meanings in higher education and was found in different kinds of activities. Excellence is the result of superior attainment in meeting distinctive goals and exists in many varieties in universities. It can be achieved and recognised in higher education and be seen to exist in students, teaching, research, departments, programmes and management of universities. Evidence that excellence exists is seen in new theories, new machines, the mind that finds its most effective expression in teaching and research, Nobel prizewinners, publications, books and new innovations.

Excellence can be achieved by any individual or group of individuals or institutions. It should however, not be confused with elitism or prestige. The use of words elite and elitism should be discontinued and in its stead excellent and excellence be used.

Equality, the other concept, that means equal opportunity in higher education can exist with excellence and the two are not mutually exclusive.

To raise the visibility of the excellence crusade all universities should promote excellence in whatever they do in teaching and research. It is not suggested that institutions attempt to solve the social and economic problems of a country; that is the role of society and Government.

If excellence is the raison d'etre of higher education then specialisation is necessary in the graduate schools for the advancement of learning and the promotion of the highest standards of excellence. This can be achieved by the marriage of teaching and research in universities because the interplay between the two enhances excellence in each other.

The quality and effectiveness of teaching can be improved by internal evaluation of teachers conducted by specialists in the area, student evaluation and by the teacher having a complete mastery of the subject matter. Even a though a teacher may be good, it may not be enough to assure him that he can continue

teaching at a university if the number of students drop in the 1990s and whole institutions or departments have to be closed down.

Very little effort has been put into the evaluation of programmes and what its content should be. The substantive elements of a course include relevance, new knowledge, excellence in planning and purpose. If the content of courses is inadequate, the content should be changed.

The elements in the evaluation to continue or eliminate a programme should be based on the following criteria:-

(1) Academic importance

(2) Enough student interest

(3) Achievement of excellence by the programme

(4) Adequate finance for the programme

All consequences must be fully examined and decisions made immediately an institution becomes aware that a programme does not meet the four criteria and any one of them.

Talented students who are capable of excelling in higher education should not be wasted. Other methods of identifying talented students need to be found in addition to the 'A' Level results such as accepting students on the promise they show to

excel.

Most of the research in universities is of a high quality because of the increased competition for limited resources. Universities would be able to attract more funds for research if they are willing to assist industry by showing them how results from research can be applied in manufacturing. More university - industry cooperation and collaboration is necessary.

Excellence can be recognised in higher education; and if this is so, it can be measured. Excellence in research, teaching, programmes, students and departments have been measured at a number of institutions. The methods of evaluating excellence are many and varied. For big science, the method of 'converging partial indicators' would be one of the better techniques. The biggest limitation to this method is the cost of collecting and analysing the data. A simple publication count with weighting the quality of journals appears to be cost effective in small research projects together with peer evaluation by eminent scientists in the same subject area.

Though the evaluation of teachers and programmes gets more difficult to measure it is not immeasurable. The method shown in Table 5.7 is a simple method once the characteristics and sources of information can be computerised. The cost of such an evaluation would not be significant as the whole process can be

performed by the staff of a university. Also, some comparisons can be made across disciplines.

Unemployment of graduates in the present environment is of great concern to a number of universities. Engineering and technology graduates appear to be able to obtain employment with less difficulty than the other graduates. Graduates of some universities are sought after more than others and this reflects the quality, not only of the graduates, but also of the institution and its programmes. The one thing that an institution can do is, not only to strive for excellence, but to make certain that it is being achieved by regular evaluations of the quality of students, staff teaching and research. All institutions can achieve excellence no matter how small they are or what their goals are, so long as they strive for excellence in whatever they do.

To achieve excellence, resources and the efficient and effective use of these resources are required. Resources have to be managed in an environment of decline and equilibrium. Long-term planning is difficult when the Government will not make allocations more than one year ahead. Resources are therefore required to be managed by redistributing existing resources within a university where students numbers are not expected to decline until the 1990s. This naturally means the elimination of programmes and departments not meeting the criteria for continuing current programmes.

Government financing patterns will have to change to enable universities to prepare long-term plans. The changes in financing are unlikely until there is visible evidence that improvements in efficiency, effectiveness and relevance are being made in higher education programmes. Institutions will have to make the argument that in the long-term higher education is as essential to the national well-being as public health or national defence.

Those institutions that build good reputations in the pursuit of excellence will survive. Excellence may not be enough; the way higher education markets its products, for the general public and the Government, will be another factor to be considered in the survival of institutions.

It is imperative that the university be well managed when the institution is contracting. If bad management exists in contracting institutions, it tends to lead to disintegration of the institution. Management must develop counter forces which will allow the organisation to maintain viability and excellence.

All universities, at all levels, will have to face up to further cutbacks, the coalescing of courses, the closing down of sections of departments and concentrating of courses in some universities. In the process of rationalisation, the pursuit of excellence should not be cast aside. If rationalisation

amounts to setting up centres of excellence, this in the long-term is better than a deterioration of high standards. The excellence of universities, for which Britain is renowned throughout the world, should not be allowed to deteriorate in facing issues that will confront them in the next few decades. They are:-

- decrease in eighteen year old birth rates;
- steady state or decline in resources;
- changing social values;
- changing environments such as political and economic;
- inflation;
- weak market for graduates;
- increasing public demand for accountability;
- increasing competition for the scarce resources available;
- motivation to maintain excellence;
- the growing bureaucratic involvement in the administration and operation of universities;
- the oversupply of teachers in non-science subjects; and
- the determination of what constitutes a legitimate learning experience, including off-campus learning, use of the mass media, individual self-directed learning, cooperative education and computer-assisted learning.

DILEMMAS AND SHORTCOMINGS

It became apparent that the topic chosen could not be studied in great detail because of its wide scope. Data were in some cases difficult to obtain. Also, if the data were available, detailed analysis would have taken long periods of time for comparisons to be made.

Further study is required before any constructive comparisons can be made and any conclusions reached. The evaluation of programmes would be an area where further studies may be justified and interesting.

APPENDIX A

The present author requested to interview seventeen people (see attached letter) to supplement the literature available on "Centres of Excellence in British Universities" and eleven accepted and were interviewed. They were:-

(1) Sir Monty FINNISTON — Monday, 21st July, 1980
Chancellor
University of Stirling.

(2) Professor A.H. HALSEY — Tuesday, 22nd July, 1980
Director of Social & Administrative Studies
University of Oxford.

(3) Professor G.R. HIGGINSON — Monday, 11th August, 1980
Department of Engineering Science
University of Durham.

(4) Dr. LAVERICK & Mr. A.C. SENSICLE — Wednesday, 23rd July, 1980
The Institution of Electrical Engineers.

(5) Professor P.G. MOORE — Monday, 21st July, 1980
Deputy Principal
London Business School.

(6) Mr. B.W. OAKLEY — Thursday, 24th July, 1980
Secretary,
Science Research Council.

(7) Mr. M.V. POSNER, — Wednesday, 23rd July, 1980
Chairman,
Social Science Research Council

(8) Professor E.H. RHODERICK — Friday, 18th July, 1980
Department of Electrical Engineering
and Electronics
University of Manchester Institute
of Science and Technology

(9) Professor J. SPENCE — Tuesday, 29th July, 1980
Department of Mechanical Engineering,
University of Strathclyde

(10) Professor D.J. TEDFORD — Tuesday, 29th July, 1980
Department of Electrical Engineering
University of Strathclyde

(11) Mr. N.P. THOMAS — Tuesday, 22nd July, 1980
University Grants Committee

DURHAM UNIVERSITY BUSINESS SCHOOL
POSTGRADUATE STUDENT - Vernon Jones
Mill Hill Lane Durham DH1 3LB England
Telephone 41919 ext

6th July, 1980.

Dear

I am a full-time student at Durham University Business School undertaking the M.Sc. Programme in Management Studies.

As part of the programme, I am preparing a dissertation entitled: "Centres of Excellence in British Universities" which is required to be submitted by 30th September, 1980.

I would like to supplement the literature available by interviewing leading educationalists, such as yourself, during the week beginning 16th July, 1980.

I would very much like to meet and speak with you on the subject and would be most grateful if you could suggest a few alternative days when you are available, and I will confirm one immediately I hear from you.

Dr. L.H. Campbell is my supervisor and may be contacted on Durham 41919.

Yours sincerely,

Vern Jones

INTERVIEW FORMAT

Introduction

The present author introduced the topic and proceeded to ask questions on centres of excellence. It became apparent during the interviews that the educationalists were reluctant to make comments for fear of being quoted. This was easily resolved when they were told that the answers to the questions put would not be referred to any specific person. For the same reasons no interview was recorded.

The following questions and answers from all the interviews may be summarised as follows:-

QUESTION What do you consider 'excellence' means in British Universities? Can it be achieved and measured?

ANSWER Excellence consisted of the following elements:-

- added value;
- the contribution of improvement to teaching and research and this contribution must be relevant to the goals of a university;
- a combination of difficult mixes of (1) a crushing power of analysis in a particular subject area, (2) an assembling of factual

material in a way that changes one's understanding of the way the world works in a particular aspect and (3) the quality of scholarship recognised by the correctness of facts;

- reputation an institution earns;
- high quality research output;
- high quality of students and teachers;
- funds attracted from research councils and industry;
- size of departments measured by the number of degree students;
- scientific and research publications;
- the way industry sought graduates from various institutions;
- the citing of authors in papers and publications; and
- having read an article, one feels that the reader should have thought of the idea.

Excellence could be recognised and achieved but difficult to measure. However, if excellence was given some meaning it could be measured even though the measurement was stated in subjective terms. Comparisons was possible in the same discipline but was difficult across disciplines.

QUESTION Are there any 'centres of excellence' in British Universities and would they compare favourably with overseas institutions?

ANSWER There are centres of excellence in British Universities. The following were mentioned:-

- Oxford
- Cambridge
- London
- Southampton
- Birmingham
- Edinburgh
- Manchester
- Manchester Institute of Science and Technology.

In specific specialised areas of study these universities would compare more than favourably. Oxbridge for undergraduate education would be one of the best in the world.

QUESTION Should centres of excellence be established in the United Kingdom?

ANSWER Most agreed they should but others were not so sure and stated that the biggest danger would be that if a department was considered a centre of excellence then other departments in the same institution would not be. The research councils had created centres of excellence from time to time and some are still in existence. Imperial College in the early 1960s was given special

grants to strengthen the claim that they were a centre of excellence not only in the United Kingdom but in the world. It was suggested that before centres of excellence could be considered, the aims, functions and roles of higher education and universities in particular need to be stated. The designated research centres were not considered as centres of excellence and should not have been established in the present environment.

QUESTION Should teaching and research be separated and would the separation enhance the pursuit of excellence?

ANSWER The unanimous answer was no, because the marriage of teaching and research enhance excellence in each other. However, it was agreed that not all good teachers were good researchers and not all good researchers were good teachers. The best mix of teaching and research was not suggested and could not be measured.

QUESTION What is excellence in research?

ANSWER Excellence in research is based on peer evaluation both before a research grant is approved, during and on its completion. The method of peer evaluation consists

of evaluating research projects in terms of the national interest which was difficult to define as over time national interests change and government and industry are reluctant to give the research councils any lead as to what constitutes national policy.

The method of peer evaluation consists of a dosier starting with the application for a research grant. Confidential opinions are sought from eminent scientists and referees on the quality of the research project and the researchers. A rapporteur is responsible for each application which is submitted to a committee for assessment with each getting marks. The Science Research Council grates their applications into Alpha, Beta, Gama with Alpha subdivided further into 1st, 2nd and 3rd. Only the Alpha projects are likely to be supported and there is some doubt about that at the present time. The Social Science Research Council grade their applications into first, second/1, second/2. All borderline applications are re-evaluated to make certain that excellent research projects have not been overlooked. Although excellence in research projects is encouraged and sought, adequacy is insisted upon.

QUESTION How are resources allocated to the universities.

ANSWER The UGC allocates funds to the universities on a number of factors such as excellence and student numbers. Specific grants have been allocated in the past for universities to build up weak departments and strengthen good departments in selected institutions. This method is a way of steering the system in a pre-determined direction. It was extremely difficult for the UGC to decide on allocations to the universities in the present environment of cutbacks and uncertainties. The period of time given by the government to the UGC to finalise allocations for 1980/81 was a month. It was also difficult to make allocations to universities when no forward planning is given by the Government and is not conducive to the pursuit of excellence.

Conclusion

It should be pointed out that not all the questions and answers have been set out from the interviews and only the ones used in this dissertation have been included.

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